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**SOUTHERN
STATES
ISSUE**

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VOLUME XCVI, NUMBER 758

MAY 1940

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THE
"CORN STATES'"
ADVERTISING
POLICY

The custom now in vogue has been pursued through the years with but rare exceptions.

Those who examine the advertising pages of the leading medical journals of this day will find that the outstanding producers of technical supplies glorify the physician, the surgeon, the hospital and the work of the medical profession;



Home Plant of The Corn States Serum Company

selling products through these periodicals is regarded as subordinate to building up the vocation they have the honor to service. The object is to acquaint the public with a better understanding of the part the profession plays in the social and industrial circles.

Needless to remind the veterinarians of the United States that the "Corn States" advertisements through all the years of modern veterinary development have kept "Promotion of the veterinarian's interest" in the foreground.

APPROBATION OF THE PATTERN IS A WORTHY TREND

THE
CORN STATES SERUM COMPANY
OMAHA

Journal of the American Veterinary Medical Association

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VOL. XCVI

MAY 1940

NO. 758

• *Southern States Issue* •

A Message from

HONORABLE HENRY A. WALLACE,

Secretary of Agriculture,
on . . .

Veterinary Services in the South

SOUTHERN LEADERS agree that a fundamental need of agriculture in the South is more diversified farming for the good of the land and for larger home production of food, feed and live stock.

Protection of the livestock industry is essential to progress toward this objective. It helps to make possible more diversified farming and helps to provide more food and better incomes for southern farm families. Better control of harmful animal diseases and parasites through scientific research and education and through services of veterinarians is making possible a more permanent and more profitable livestock industry.

The conquest of bovine tuberculosis and the cattle tick is now practically completed. Development of a swine sanitation system has played an important part in the control of kidney worms, which have long taken a heavy toll in the southern states. The work of the veterinary profession in

controlling such devastating diseases as anthrax has protected the health of livestock owners and the public as well as the valuable animals susceptible to this disease.

In these and many other efforts to protect the livestock industry the United States Department of Agriculture has had a vital interest. In the South special efforts are made by the Department in behalf of the livestock industry through its various field stations and through its new animal-disease laboratory at Auburn, Ala.

The good results of the efforts of all individuals and agencies concerned with improvement in the livestock industry are evident in the increasing number of more productive and more valuable herds and flocks.

The demand for veterinary services can be expected to grow with increasing diversification of farming and with increasing value and importance of live stock on southern farms.

B.A.I. Contributions to Southern Stock Raising

By JOHN R. MOHLER,* V.M.D., D.Sc.

Washington, D. C.

CHANGES in southern agriculture in recent years have attracted nationwide interest. Amid the varying views and recommendations intended to guide such development along the most beneficial lines, the central current of thought has been diversification with special emphasis on live stock. A wealth of statistics—involving temperature and rainfall data, food needs, pasture land, and related data—indicate attractive opportunities for a greater livestock enterprise. In fact, domestic animals are one of the most effective means of converting pasture, roughage, and other feed crops into cash returns well distributed throughout the year.

SCIENCE DISPELS DISCOURAGEMENT

Throughout the trend of changes here outlined the federal bureau of animal industry has sought to be of assistance through research findings and their practical application. One of the early obvious needs was a better control of animal parasites and diseases which formerly caused great discouragement among livestock owners. Although disease problems have been general throughout the country, they were especially troublesome in the South, where the same mild climate which produced livestock feed in abundance also favored the development of parasites and other injurious organisms.

The story of veterinary conquest over the cattle-fever tick (*Boophilus annulatus*) has become so familiar to scientific workers and the general public as to need no detailed elucidation at this time. Briefly, a short period of scientific research by a group of the bureau's investigators disclosed the true nature of tick fever and the rôle of cattle ticks in perpetuating the disease. These discoveries, however, were but the beginning of veterinary service aimed at the com-

plete eradication of cattle ticks from thousands of square miles in 15 states. To attain the desired goal, it was necessary to acquaint the public with the new findings and to convince officials that the proposal for eradicating ticks was sound and deserving of public support. To this end the bureau found it desirable to conduct an extensive information program, including distribution of publications, press material, and motion pictures. The bureau also fostered essay contests among school children and encouraged public speaking and debates to bring about a better understanding and greater support of the work.

SOUTH MADE SAFER FOR STOCK RAISING

Notwithstanding all these efforts, disheartening opposition occurred in many localities. Many dipping vats were dynamited; inspectors engaged in the work were threatened with violence; and in a few cases employes were murdered in the conduct of their duties.

I mention these conditions largely as a reminder of the courageous and heroic efforts of veterinarians and other employes in making the South safer for stock raising. Time has brought about a much better appreciation and understanding of inspection services so that the great majority of stockmen now welcome veterinarians as their friends and allies in placing stock growing in the South on a sound foundation of health. Only under such conditions can breeding operations be conducted safely and progressively.

Tick eradication prepared the way for other services, such as the suppression of bovine tuberculosis and, still more recently, the campaign against Bang's disease. These activities have encountered relatively little opposition and have been distinctly advantageous to the dairy- and beef-cattle industries. It is noteworthy that a southern state, North Carolina, was the first state to

*Chief, Bureau of Animal Industry, U. S. Department of Agriculture.

qualify as a tuberculosis-free modified area, signifying the practical eradication of that disease in cattle.

FAVORABLE FINANCIAL SENTIMENT

A further significant development is that officers of banks and credit organizations, in recent years, have looked upon live stock with increasing favor as security for loans. This trend of financial sentiment is explainable, at least in part, by improved means of protecting animal health. Of course, greater intrinsic value of improved live stock over that of native types is a large contributing factor. In any case the trend toward greater recognition of stock raising as an important, sound business enterprise in the South is a development that veterinarians may advantageously foster in their professional, business and social contacts.

MANY COÖPERATORS SHARE IN ACHIEVEMENTS

Any attempt to recount the specific contributions of this branch of the federal government to the livestock industry in the southern states must necessarily include the related services of coöperating state officials, practicing veterinarians, banking and credit officials, as already noted, educators, and many allied interests. These interests embrace livestock organizations, the agricultural press, railroads, civic bodies, and other agencies interested in the enterprises undertaken. Considered on such a coöperative basis, contributions which have greatly benefited southern agriculture and stock raising include the following:

1) Success achieved in preventing livestock plagues of foreign countries from reaching the United States;

2) the discovery and determination of the nature of tick fever and the development of a practical method of ridding the South of ticks which convey the infection from infected to susceptible animals;

3) the discovery of a new species of human hookworm in the South, together with discoveries of carbon tetrachloride and tetrachlorethylene as means of combating hookworms;

4) the development of improved meth-

ods of making tuberculin for diagnosing tuberculosis in live stock, and the use of such tuberculin in detecting tuberculosis in live stock and achieving eradication of this disease;

5) important studies in animal genetics and the dissemination of such knowledge for the improvement of live stock by the use of high-quality sires and related methods;

6) the development of a serum which produces lasting immunity against hog cholera;

7) the establishment of a national meat-inspection service which, in addition to protecting human health, discloses knowledge concerning animal diseases in various regions and localities;

8) the development of methods of controlling losses caused by roundworms and kidney worms in swine;

9) practical methods of determining grease and dirt in wool and a system of sampling fleeces to determine clean-wool content;

10) establishment of the National Poultry Improvement Plan;

11) improvements in methods of handling live stock in interstate and export trade;

12) the development of suitable dips for freeing animals of various external parasites, and means of testing the strength of dips in vats;

13) investigations of Bang's disease, blackleg, anthrax, dourine, encephalomyelitis, anaplasmosis, and other diseases of animals and means of combating them; and

14) studies of adaptability of animals of foreign origin, such as Brahman and Africander cattle, for use in warm climates and feasibility of various crosses of such animals with breeds already well established in the United States.

In addition to the foregoing items, numerous other lines of research have broad applications in the South, for instance, studies of animal nutrition with special reference to mineral and vitamin requirements. The bureau fully appreciates that findings in the laboratory, experiment station, or federally inspected establishment

are, figuratively, merely seeds that require planting and development for the attainment of practical benefits. Accordingly, use has been made of well-established means of extending knowledge in the fields described. In recent years the radio has been a valuable addition and aid.

ANIMAL-DISEASE-RESEARCH LABORATORY ESTABLISHED

Further tangible evidence of assistance to the southern states in the livestock and veterinary fields has been the establishment of the animal-disease-research laboratory at Auburn, Ala. Although still in its infancy, this station already has begun several lines of investigation to advance scientific knowledge still further, on subjects on which southern stockmen have requested aid.

As we note the condition of agriculture and livestock raising from day to day and even from year to year, the changes may seem rather small. But when viewed over periods of decades and especially since the establishment of the bureau, one is impressed by the extensive replacement of opinions by established fact and by the marked industrial development in the South with special reference to the meat and dairy industries.

In preparing these observations for the consideration of members of the American Veterinary Medical Association, I deem the discussion incomplete without mention of the many earnest, energetic, and capable veterinarians and other employes who have

devoted the useful years of their lives to the work here outlined. Their presence in the South, their interest in the work, and their contributions lend a personal and human touch to the panoramic picture here portrayed.

MANY GIVE LIFELONG SERVICE

Contributions to agriculture and industry can not well be measured in pounds of commodities or dollars of enhanced industrial investment. Yet, it is fitting that tribute be given to all those who have contributed to improve southern agriculture and industry. As illustrative of this human side, it is noteworthy that W. E. Cotton, formerly in charge of the bureau's Animal Disease Station near Washington, D. C., and recently retired because of age, is still devoting his knowledge and energies in the veterinary field by teaching in the Alabama Polytechnic Institute. Tait Butler, C. A. Cary, J. W. Connaway, Cooper Curtice, W. H. Dalrymple, Mark Francis, M. Jacob, and many others, beloved in the South for their contributions to tick eradication and other professional accomplishments, likewise exemplify devotion to veterinary science and its useful applications.

Thus, by combining knowledge, energy, and earnestness of desire to render public service, the veterinary profession seeks to extend its influence and to aid others in building on the firm foundations already established.



WAR MEMORIAL BUILDING AT
LITTLE ROCK, ARK.

The construction of this building was started in 1833 and completed about ten years later. The first Arkansas legislature met here in 1836 and inaugurated the first governor of the state. The building was used as the seat of the state government until 1911. It became the War Memorial building by legislative resolution in 1921. The offices of C. D. Stubbs, state veterinarian, are now housed here.

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Places to See When You Visit the National Capital in August

Above, a view of the National Cathedral, one of the most beautiful structures of its kind in the world. Right, Mount Vernon, the home of George Washington. Below (left to right): The statue of Abraham Lincoln in the Lincoln Memorial; the Washington Memorial; Arlington Memorial bridge, which connects the Lincoln Memorial with Arlington cemetery.

(Photos courtesy of Underwood & Underwood, Leet Bros., and Harris & Ewing.)



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*Places to See
When You
Visit the National
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Above, a view of the National Cathedral, one of the most beautiful structures of its kind in the world. Right, Mount Vernon, the home of George Washington. Below (left to right): The statue of Abraham Lincoln in the Lincoln Memorial; the Washington Memorial; Arlington Memorial bridge, which connects the Lincoln Memorial with Arlington cemetery.

(Photos courtesy of Underwood & Underwood, Leet Bros., and Harris & Ewing.)



The Washington Session

BIGGER AND BETTER attractions than have been offered at any previous A.V.M.A. convention are in store for veterinarians from all parts of the country, in Washington, D. C., August 26-30, during the annual meeting of the Association.

Sightseeing during the 1940 convention will occupy a rather large part of the time. Not in years has a convention city offered such an opportunity for sightseeing as does Washington. Excursions are planned to Mount Vernon, Marshall Park, the Capitol, the White House, the Supreme Court building and a score of other national landmarks.

As final plans are being shaped by the program committee, a boat trip to Mount Vernon and Marshall Hall Park for the entire convention party is tentatively scheduled for the afternoon of August 29.

Buses will take veterinarians and their families to the wharves of the Wilson Lines. From there they will cruise down the Potomac to the home of George Washington. Outlined against the sky, a parade of scenes, such as the dome of the Capitol building, the Washington Monument, the Army and Navy airfields, the Naval submarine base, the famous City of Alexandria and Fort Washington, will pass in review. Air-conditioned committee rooms will be open for Executive Board and other meetings aboard the new streamliner "Mount Vernon."

A Secret Service motion picture film, "Know Your Money," and the A.V.M.A. film "Veterinary Science Protects Public and Animal Health," to be shown in the grand ballroom of the Mayflower Hotel on Monday evening, August 26, are among the latest features planned for the enjoyment of convention guests.

While convention delegates attend demonstration clinics in the grand ballroom and the Chinese room of the Mayflower Hotel, their wives will be offered a sightseeing bus

tour and a visit to government buildings to be followed by a luncheon in the Blue Room of the beautiful Shoreham Hotel on the edge of Rock Creek Park.

Optional trips to the research laboratories at Beltsville, Md., and the operative clinics at Fort Myer are scheduled for convention goes on Friday afternoon, August 30. Buses will be provided for those desiring to attend.

After the convention closes, there will be renewed opportunities for interesting sightseeing tours, such as trips to the Army Remount Station at Front Royal, Va., the historic city of Williamsburg, Va., with its restored early Colonial buildings, Atlantic City, N. J., and the New York World's Fair.

HOTEL RATES

It is suggested that those planning to attend the convention make their reservations for hotel rooms at an early date. At the Mayflower Hotel, which will be convention headquarters, the rates are as follows: Single room for one person, \$3.50-\$5.00; double room with double bed for two persons, \$5-\$7; double room with twin beds for two persons, \$6-\$9. Surrounding hotels and their rates are:

Hotel	Single	Double Bed	Twin Beds
Lee House.....	\$3.00	\$5.00	\$6.00
Blackstone		5.00	6.00
New Colonial...	2.50-3.00	4.00	4.50
Lafayette	2.50-3.00	3.50-4.00	4.00-4.50
Martinique	3.50	5.00
Benedick.....	2.50	3.50	4.00

Our national association has a clean record, a history untainted with selfish motives. "For the public good" is written across its banner. It is now engaged on a large scale in making the public conscious of its efforts—trying to build a "veterinary house" that can be seen and understood. It can not now afford to confuse its objective with any movement that might be misconstrued.

Prepare to Visit the National Capital in August

The Agricultural and Livestock Situation in the South

By M. JACOB,* V.M.D.

Knoxville, Tenn.

IN AN ISSUE of the JOURNAL devoted to the veterinary profession of the South, it seems quite appropriate that at least a brief statement should be made on southern agriculture and its livestock industry. The reason for such a statement is obvious when we take into consideration the important place of veterinary science in a progressive and constructive agricultural program.

The following 13 states are included in the area which is specifically designated "The South": Alabama, Arkansas, Georgia, Florida, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia. In order to illustrate the approximate status of the South, from the standpoint of a comparison with the entire United States, the table shown on the following page has been prepared.

*Dean, College of Agriculture, The University of Tennessee.

While the South in some of its sections has been afflicted and has suffered as the result of a single-crop system, especially in the production of cotton, yet there is no other part of the North American continent which lends itself better to diversified agriculture.

The cash income from farm crops in the 13 southern states, for the year 1938, in comparison with the United States as a whole as set forth in table I, is truly representative of the South's potentialities even under the present conditions.

As in other sections of the United States, soil conditions, temperature and moisture are the factors which determine the possibilities in crop production, and through this the economical production of live stock. Of course, temperature and moisture are largely beyond human control, but in the conservation of our soil the human element plays an important part. The people of the

TABLE I—Rank of principal crops according to cash income.

NAME OF CROP	SOUTHERN STATES	UNITED STATES
Cotton lint and cottonseed	\$597,831,000	\$667,235,000
Cotton lint	515,907,000	575,741,000
Cottonseed	81,924,000	91,494,000
Tobacco	267,275,000	294,063,000
All grain	136,351,000	842,873,000
Total fruits and nuts	116,378,000	403,577,000
Truck crops	71,205,000	318,176,000
All vegetables	107,652,000	501,991,000
Principal grains:		
Wheat	68,415,000	432,691,000
Corn	30,481,000	271,657,000
Potatoes*	25,261,000	136,109,000
Principal fruits and nuts:		
Strawberries	15,190,000	38,918,000
Peaches	12,978,000	30,414,000
Apples	11,051,000	92,231,000
Pears	1,015,000	12,099,000
Grapes	801,000	37,012,000

*Includes sweet potatoes.

TABLE II—Population, agricultural assets and livestock status of the South as compared with the entire United States.

ITEM			13 SOUTHERN STATES	UNITED STATES	PER CENT SO. STATES IS OF U. S. TOTAL
Total estimated population (1937)			36,459,000	129,257,000	28.2
Total population (1930)			35,500,858	122,775,046	28.9
Rural population (1930)			24,181,494	53,820,223	44.9
Land in farms (1935)—acres			361,474,853	1,054,515,111	34.3
Crop land harvested—acres			98,119,164	295,624,176	33.2
Pasture: Plowable			30,531,974	98,579,038	31.0
Woodland			52,060,292	108,095,711	48.2
Other			85,009,908	311,225,652	27.3
Cattle:	Number	1935	20,847,274	68,284,409	30.5
	Value		\$295,475,305	\$1,387,896,074	21.3
Swine:	Number	1935	11,401,327	37,212,967	30.6
	Value		\$ 55,955,824	\$220,367,009	25.4
Sheep:	Number	1935	9,833,212	48,357,506	20.3
	Value		\$ 36,051,380	\$208,871,101	17.3
Chickens*: Number	Value	1935	106,726,181	371,603,136	28.7
			\$ 46,496,643	\$191,503,382	24.2
Turkeys*: Number	Value	1935	1,901,778	5,381,921	35.3
			\$ 3,601,257	\$ 11,667,677	30.9
Total chickens and turkeys*:	Value	1935	108,627,959	376,985,048	28.8
			\$ 50,097,900	\$203,171,509	24.7
Horses:	Number	1935	2,127,100	11,857,850	17.9
	Value		\$137,616,015	\$913,437,099	15.1
Mules:	Number	1935	3,804,321	4,818,160	78.9
	Value		\$384,893,242	\$478,651,198	80.4
Total value agricultural products, 1938 (income estimate)			\$2,637,255,000	\$8,737,755,000	30.2
Gross value of livestock products sold, 1938 (income estimate)			\$1,122,907,000	\$5,253,709,000	21.4

*Chickens and turkeys over 3 months old.

South, as in practically every other agricultural section of the country, have been guilty of permitting excessive soil depletion, yet there is every indication now of a definite soil-improvement consciousness, especially on the part of all agencies, including the farmer himself. Our farmers are recognizing and accepting the basic principle that if the soil upon which their income depends is to produce efficiently and economically, both in crops and live stock, plant food, especially lime and phosphorus, must be amply supplied. We do have certain sections in the South where these plant-food elements are and always have

been present in abundance, and in these areas the production of live stock of all kinds is being carried out on a plane equal, or superior, to that of any other part of the United States. For example, the substance and texture of bone characteristic of horses and mules raised in our bluegrass sections, where the soil is naturally well supplied with the essential mineral elements, is known throughout the world. Similar accomplishments in herd building have been achieved in the range section of the Southwest, where unlimited acreage of pasture land makes it comparatively easy to furnish the essentials for economical livestock production.

Under the existing land-use planning program, thousands of acres will be thrown out of cultivated or row-crop production and seeded to grazing crops or converted into woodland. The availability of more and better grazing will of necessity tend toward a gradual but perceptible expansion of our livestock industry, especially in the cattle division.

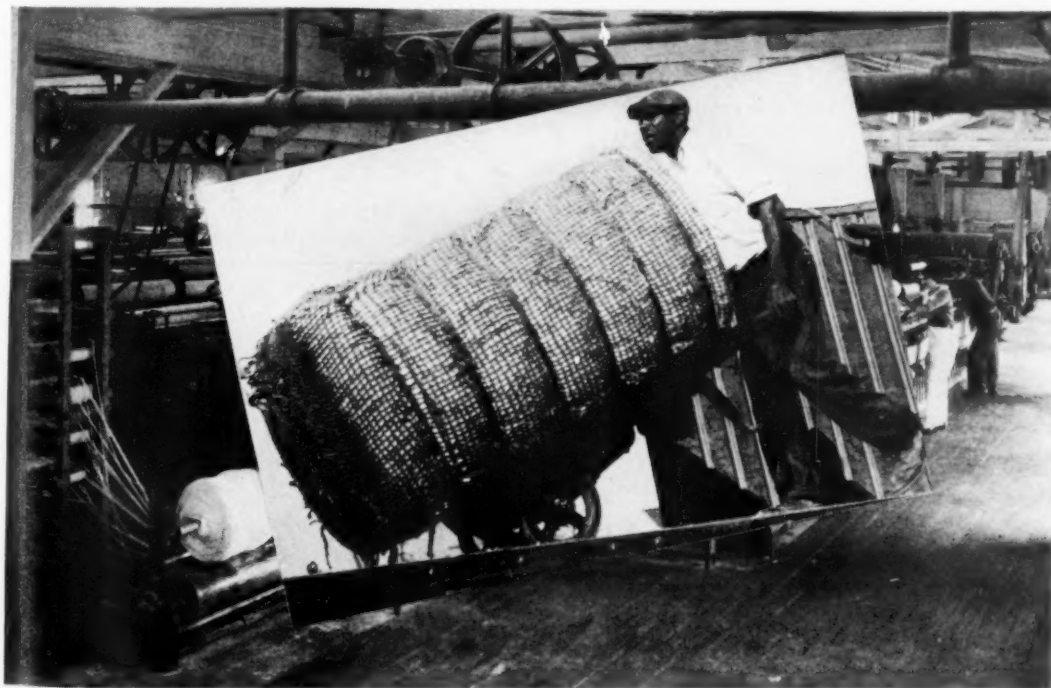
Slight reference already has been made to available moisture for crop production, but its importance can not be overemphasized. The records over a period of many years reveal an average yearly rainfall comparing favorably with the average of any other section of equal size in the United States.

Markets and marketing facilities for the products of the farm are also vital factors which must be considered in evaluating the possibilities of an agricultural and livestock enterprise. Superior highways and excellent railroad facilities leading to favorable local and central markets, and all within

reasonable distance, have added materially toward bringing about greater stability in the agricultural program of the South. Then, too, the southern farmer and livestock breeder has not been lagging in his efforts to cooperate with the veterinary profession through regulatory and private services in the control and eradication of transmissible livestock diseases. As a result, no other section enjoys a better health status of its herds and flocks, even though it required remarkable courage and fortitude to overcome the obstacles, especially the southern cattle-fever tick, which at one time prevailed throughout a large portion of this section.

While southern agriculture during recent years, as in every other section, has faced serious economic distress, the rural people are accepting the challenge with a determination to build a more permanent agriculture, based on sound economic principles, and a philosophy aimed toward a happier rural life.

The South and King Cotton



The cotton industry accounts for much of the economic importance of the South.

The Livestock Industry of the South*

By A. L. SHEALY, D.V.M.

Gainesville, Fla.

THERE IS an awakening in the South to the opportunities in livestock production. During the past five years there has been a decided shift from the one-crop system of cotton or tobacco to a truly diversified type of agriculture, with live stock as an important source of farm income. It is interesting to note that during the 50-year period from 1880 to 1930, there was a decrease in the numbers of live stock in the South Atlantic States. It has been shown that in 1930 these states had 24 per cent fewer hogs, 6 per cent fewer beef cattle, and 44 per cent fewer sheep, than in 1880. During that period the population of this section increased 107 per cent. There was a 498 per cent increase in tobacco and a 138 per cent increase in cotton production. During the past decade the price of cotton has been unfavorable and at the present time the outlook for tobacco is not bright. Hence, there is a definite swing towards live stock throughout the entire South. The southern farmer is looking to live stock as another source of farm income. Also, thousands of acres of cut-over pine lands are being developed into permanent pastures, thereby affording an income to catlemen.

Within the past five years there has been an increase of 250 per cent in the slaughter of calves in the Southeast and 170 per cent in the slaughter of other classes of cattle. It can be seen, therefore, that the South is expanding its livestock industry.

The menace of the cattle-fever tick was the greatest possible hindrance to any expansion of the dairy industry and to beef-cattle production in the South. A quarantine line was established in 1906 by the federal government. At that time a systematic program of tick eradication was inaugurated. This program went forward

in spite of difficulties of almost every conceivable kind, until today over 98 per cent of the quarantined area has been released. John R. Mohler, the present chief of the Bureau of Animal Industry, United States Department of Agriculture, will be long remembered as one official who has made it possible for the South to have a profitable industry. With the name of Dr. Mohler are placed the names of numerous state veterinarians who have had to fight persistently to eradicate that last tick in each southern state. Without tick eradication there would have been no improved dairy- or beef-cattle industry in this section. For years prior to tick eradication the South tried to expand in livestock production, but purebred cattle purchased in tick-free territory and brought into tick-infested areas would develop tick fever within a few months and die. The cattle that were native to the southern states and immune to tick fever were decidedly undersized, emaciated, and of low grade.

With the new era in livestock production, the picture has changed entirely. At the present time the grade of cattle raised in this section compares favorably with those in other sections of the country. Outstanding dairy herds have been developed and dairy cows with national records for production are to be found in the Southland. Steers that grade "prime" have been born, raised and fed here. All of these changes have been made since the cattle-fever ticks have been eradicated.

The South is blessed with a long grazing season and with a soil that is adapted to the production of grass. It should be noted that grass is the cheapest feed that may be produced. Purebred sires have been introduced extensively within the past decade, which means that with better blood and improved pastures the grade of cattle has been boosted considerably, and will go

*From the Florida Agricultural Experiment Station.

constantly higher. With the production of corn and velvet beans as grain feeds, and being the home of cottonseed meal, the South can finish slaughter cattle for market in many sections. For roughage such hays as cowpea, kudzu, soy bean and native grass are available. Crops for silage include corn, sorghum and sugar cane. It can be seen that the South can raise feed crops for finishing many cattle produced within this area.

But there are sections in the South, especially the Southwest and extreme Southeast, where these grain crops do not yield abundantly. Fortunately, in these sections a long grazing season prevails and improved pasture grasses thrive. These sec-

tions will produce "feeder" cattle to be shipped to states to the North. Indeed, "feeder" steers are being shipped from Florida to Ohio, Pennsylvania, West Virginia and other northern states at this time. For the past five years, calves have been shipped from the Southeast to eastern markets.

Last, but not least, it should be stated that southern farmers and livestock owners are becoming "livestock-minded." They are learning their first lessons in livestock production and like their work. With the interest that is being manifested for improved live stock in the South, the outlook for this phase of agriculture is bright for this section.

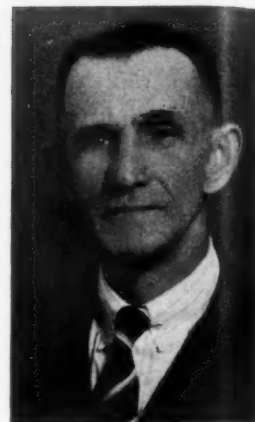
The Alamo



Known throughout the world as the shrine of Texas liberty, the Alamo is the old chapel of Mission San Antonio De Valero, founded in 1718. Few spots in world history so stir the imagination as does this low, gray church and fortress where every man gave up his life rather than surrender, that March morning of 1835.

Officers of the Southern Veterinary Medical Association

Elected at the annual meeting, held in Columbia, S. Car., November 9-11, 1939, were I. S. McAdory (right) of Auburn, Ala., president; (below, left to right) J. H. Moore of Charleston, S. Car., first vice-president; P. M. Graves of Culpeper, Va., second vice-president; L. A. Mosher of Atlanta, Ga., secretary; and M. R. Blackstock of Spartanburg, S. Car., treasurer.



HISTORY OF THE SOUTHERN VETERINARY MEDICAL ASSOCIATION

Due to the loss of nearly all of the early records of the southern association, a complete history is not available. However, the records that remain indicate that late in the fall of 1916, a small group of southern veterinarians met in Atlanta and organized the Southeastern States Veterinary Medical Association. According to some of the older members, the first regular meeting was held early in 1917. Among those responsible for the founding of the organization were F. P. Caughman, Sr., Columbia, S. Car.; A. G. Richardson, Athens, Ga.; M. R. Blackstock, Spartanburg, S. Car.; G. A. Roberts, Dominican Republic; and the following, who are deceased: C. A. Cary, Auburn, Ala.; John I. Hanley, Atlanta, Ga.; and C. R. Jolley, Atlanta, Ga.

In 1930, the Association met in New Orleans in conjunction with the state associations of Mississippi and Louisiana. During this meeting the name was changed

to "Southern States Veterinary Medical Association." It continued to operate under this name until 1938, when the Association was incorporated under the laws of Georgia as the Southern Veterinary Medical Association.

The membership is composed entirely of veterinarians in the fourth A.V.M.A. Executive Board district and, in addition, Louisiana. Every veterinarian residing in this area is considered a member in good standing. There are no annual dues, and the organization is financed by a registration fee charged those attending the annual meetings. The Association is managed by an executive board together with a board of directors. Each state in the area has a representative on the executive board. The purpose of the Association is to deal with the veterinary problems that affect the entire South and to cooperate with the various state associations and the national association.

Address of the President, Southern Veterinary Medical Association*

By B. C. McLEAN, V.M.D.

Aiken, S. Car.

IT SEEMS to be the custom of this association to have the president deliver an address at the opening session. At the present moment I am heartily in favor of changing this custom. Since I can't, I shall confess that it is a real pleasure to address this group. I have looked forward to this opportunity and appreciate your having entrusted me with the office that makes it possible.

On behalf of the officers of this association, I wish to welcome you and express our appreciation for your coming. The secretary of the Association, the various committee chairmen and members of the committees have worked conscientiously to make this meeting one of the best that we have ever had. This has necessitated real effort, for we have in the past had some very instructive and pleasant meetings. They have endeavored to provide a program of a varied nature that should interest everyone. They have obtained men outstanding in their respective lines to present the various subjects. They have planned what should be a most instructive clinic, and the social side of the meeting for both men and women certainly has not been neglected. It has been a real pleasure to be president of an organization whose members have been so interested in it and willing to give so freely of their time in its behalf. I wish to take this opportunity to express my appreciation for this fine coöperation.

It seems to me that the work the secretary of our organization has to do is more than we should impose upon any good-natured individual, such as is our present efficient secretary, Dr. Mosher, without some compensation. We are extremely fortunate in having a member who is so willing and interested in the success of this

organization to give freely of his time. As the Association grows, so does the work of the secretary. It has reached the point where, in my opinion, we should not expect anyone to do this work voluntarily. I hope that the board of directors may see fit to recommend that some sort of remuneration be provided for our secretary. (Incidentally, the secretary does not know that I am making this recommendation, and it is not his suggestion.)

FIRE INSURANCE RATES ON VETERINARY HOSPITALS

We veterinarians in the southern states are paying entirely too high a rate of fire insurance on our small animal hospitals. They are still placed by the underwriters' association in the livery or boarding stable classification. As such, the mow full of hay and straw is a fire hazard that requires a high rate. Few, if any, hospitals in this section today have this straw and hay hazard; therefore, we should not have to pay for it. A committee was appointed a few years ago to investigate this matter. They reported that nothing could be done about it. I do not wish to criticize the work of this committee, but I am informed by an insurance agent that if it is not possible to get this rate adjusted by the underwriters agreeably, our various state associations could individually demand an investigation of the rates and a reduction—and get it.

In the southeastern district, which includes most of the states that make up our association, the following rates are paid on veterinary hospitals, unless some exception has been made in individual cases. Towns are divided into first class and second, according to whether they have a full-paid fire department or a part volunteer department. In cities of the first class, such as Columbia, Atlanta and Charlotte, the rate

*Presented at the annual meeting of the Southern Veterinary Medical Association, Columbia, S. Car., November 9-11, 1939.

on brick veterinary hospitals and livery stables is \$2.25 per \$100; on frame, \$3.25. In towns such as my own (Aiken, S. Car.), where part of the firemen fight fires for the thrill, the rate on brick veterinary hospitals and livery stables is \$2.50; on frame, \$3.40 per \$100. On business stables, which include stables of ice and coal companies, milk companies, etc., the rate in first class cities on brick stables is \$1.10 per \$100, and frame, \$1.35; in second class cities, \$1.25 on brick stables, and \$1.50 on frame. On privately owned stables, where the more fortunate may shelter their own personal horse or horses, as the case may be, the rate in first class cities is 52 cents on brick and \$1.23 on frame. In second class cities, the rate is 60 cents on brick and \$1.32 on frame.

As you will notice from these figures, the rate on a brick veterinary hospital is over four times as much as that on a private brick stable, and three times as much as on a private frame stable. It is more than double the rate on brick and frame business stables. This seems ridiculous, since, certainly, the veterinary hospital of today does not contain the fire hazards that either a private stable or a business stable does. I think that this is a matter that we should put forth a united effort to have corrected, and continue in our endeavor until it is accomplished. The committee on this matter should be continued in office until they succeed in getting the insurance underwriters for this district to take veterinary hospitals out of the livery stable classification and change the antiquated rate in force at present to one in line with the modern veterinary hospital.

PUBLICATION OF CONVENTION PAPERS

The papers and talks given at these meetings are of particular interest to veterinarians of this section and should be published so that those present may further digest and refer to them on occasion, and so that they may be made available to veterinarians in this section who are not present to hear them. We have provided for the recording of the papers and discussions at this particular meeting, and if it is not possible to

have them published by the A.V.M.A. in a special edition of the JOURNAL, then I hope that they may be published and made available to the veterinarians for a fee to cover only the cost of printing. I hope that this custom will meet with your approval and that it may be continued at all future meetings of this association.

RABIES VACCINATION

During the past year rabies vaccination has been the subject of considerable discussion. Unquestionably, it has been prompted by adverse criticism of this procedure that has been featured in the press throughout the country. This is unfortunate and fortunate—unfortunate because there seems to be some difference of opinion among some members of our profession as to the efficacy of rabies vaccination, fortunate because it may be the means of clearing up this question.

Vaccination has possibly been practiced more in the southern states as a means of controlling rabies than in any other particular section of the country. We have been conscientious and sincere in our use of this method, which in many instances has been the only available way of endeavoring to hold this disease in check. From our personal observations I believe that most of us will agree that in the field, rabies vaccination certainly appears to be worth while. From some experimental work, on the other hand, rabies vaccine appears to be valueless. If such actually is the case, and it absolutely can be proved as such, then we should by all means discontinue to use and recommend it. However, in the light of our personal observations in the field, I think that we should endeavor to determine if our assumptions are correct or if we have erred.

We all know that some things that work experimentally fail when applied in practice. It seems not unreasonable to wonder if the reverse of this might not be true. On the program of this meeting we have a paper on rabies vaccination which I hope will prompt an open discussion of the subject. That we may throw further light on this matter, a committee is to be appointed to

obtain available statistics in our section where rabies vaccination has been employed, in the hope that from these statistics it may be possible to arrive at some definite conclusion as to the merit of vaccination. This is an assignment that will take considerable time and effort, but the members of the committee can be assured that they will be rendering a real service to the veterinary profession and to the dog owners of this country.

VETERINARY SERVICES IN RELATION TO SOUTH'S EXPANDING LIVESTOCK INDUSTRY

During the past few years there has been increased interest in live stock throughout the South. With extension workers advocating a livestock program as a means of farm diversification, encouraging 4-H Club boys and girls and Future Farmers of America to raise live stock as a project, this interest will continue to increase. The South has many natural advantages that should make stock raising profitable under normal conditions. It had two great handicaps—Texas fever and lack of animal sense. Our profession has removed the former and education will overcome the latter. With these two handicaps controlled in the South, stock raising is becoming a major farm industry in many sections.

It is our responsibility to provide protection to this industry from animal diseases. To give proper protection there should be an adequate supply of competent veterinarians, and our profession should have the complete confidence of the livestock raisers. Have we a sufficient number of general practitioners in the South to care properly for and protect the industry at the present time? From personal observation I do not think that we have. There are many sections that do not have the services of a general practitioner available within 25 miles. This makes veterinary services very expensive to the stock owner and encourages quackery, which certainly is not giving adequate protection to the livestock raisers.

Perhaps time and demand may provide adequate veterinary services for some of these communities, but in the meantime is

there anything that we can do that might help in providing adequate services to communities that need it? I think that there is.

1) We should encourage young men of the right type to study veterinary medicine, in order that we may have a more adequate supply of properly trained men.

2) Our veterinary schools, while maintaining the standard necessary to give thorough training in veterinary medicine, should guard against the danger of raising the requirements so high as to create a scarcity of graduate veterinarians. Such a condition might lead to legalized quackery.

3) The state and federal authorities should use the general practitioner as much as possible in the control and elimination of contagious animal diseases and remunerate him in proportion to the training and services expected. Such a policy, I believe, would make it possible for more communities to have veterinary service and for many veterinarians to have a better income.

4) To provide some communities with veterinary services, state subsidization might be considered.

5) Our public officials should use veterinarians for the work that veterinarians are qualified by training to do.

6) Extension service workers should be instructed to refer their livestock disease problems to the general practitioners.

If the foregoing could be worked out, it might be the means of providing some communities with the services of a graduate licensed veterinarian.

The livestock raiser should have absolute confidence in our profession and we should do all in our power to create and respect that confidence. We should acquaint not only the raiser of live stock but also the general public in an ethical way with the many accomplishments of our profession, of which we can be justly proud.

Some states and municipalities have obsolete regulations that if removed would tend to inspire more confidence in our profession. Glanders might be considered as an obsolete disease, yet there are some states that still require a mallein test before a horse is permitted to enter.

More uniform interstate livestock regulations that are enforceable would go a long way toward building up the confidence of the stock raiser in our profession. Regulations that inconvenience him, unless readily explainable, do not help, nor does it help for him to see what should be a regulation in regard to the control of livestock diseases flagrantly violated.

If adequate and competent veterinary protection is provided for the livestock industry of the South, if our profession has the confidence of the livestock raiser and the general public, there is little danger that any of the legislative bodies of our respective states will enact laws that might prove injurious to the best interests of the livestock industry or to our profession.

The Regional Laboratory for Animal Disease Research at Auburn, Ala.

By B. T. SIMMS, D.V.M.

Director of the Laboratory

A SIGNIFICANT indication of the trend of southern agriculture is seen in the establishment by the U. S. Department of Agriculture of the Regional Laboratory for Animal Disease Research at Auburn, Ala. This was organized under the Bankhead-Jones Act of Congress, which authorized the setting up of regional laboratories in the different sections of the country to provide a means of studying agricultural problems of peculiar interest to the area concerned. The selection of both the field of study and the location of each laboratory was left to the directors of the agricultural experiment stations of the states involved.

In the southeastern area, including 13 states from Virginia through Texas, the directors, seeing the necessity of an increase in livestock production in their region, chose infectious and parasitic diseases of domestic animals as the subjects for investigation. The Alabama Polytechnic Institute donated to the U. S. Department of Agriculture 40 acres of land as headquarters for the laboratory. This tract is immediately adjacent to the quarters of the School of Veterinary Medicine at Auburn.

The building program, which was started in the summer of 1937, is nearing completion. Structures already completed and in use include the main laboratory building of fireproof brick construction, two brick buildings for small animals, a killing and

autopsy room containing a cold storage plant, a cattle barn, a horse barn, five small isolation houses of wood construction capable of housing about four cattle each, four concrete isolation houses for cattle, ten small concrete and tile isolation shelters, garage, machine shed, shop, and men's shower and dressing room. The roads around the buildings are of concrete.

An incinerator and five additional isolation houses are to be constructed within the near future.

The selection of the staff has been completed and consists of B. T. Simms, director; Dale A. Porter, associate parasitologist; George E. Cauthen, scientific aide to Dr. Porter; Howard W. Johnson, associate veterinarian; B. Frank Cox, scientific aide to Dr. Johnson; Donald C. Boughton, associate protozoologist; George W. Bowman, scientific aide to Dr. Boughton; and Mrs. Esther M. Woodruff, secretary to the director. Of these, Drs. Simms, Porter and Johnson have been at Auburn for approximately two years, and Dr. Boughton, Mr. Cauthen, Mr. Bowman and Mr. Cox from nine to 18 months.

In addition to the regular staff each agricultural experiment station is represented by a collaborator appointed by the director with the approval of the chief of the federal bureau of animal industry. These collaborators meet at the laboratory annually to discuss the work and develop plans for the

future. The men filling these positions are: L. E. Starr, Auburn, Ala.; D. F. Eveleth, Fayetteville, Ark.; M. W. Emmel, Gainesville, Fla.; F. R. Edwards, Athens, Ga.; W. W. Dimock, Lexington, Ky.; Wm. T. Oglesby, Baton Rouge, La.; Henry H. Leveck, State College, Miss.; C. D. Grinnells, Raleigh, N. Car.; Dariel E. Howell, Stillwater, Okla.; M. Jacob, Knoxville, Tenn.; Grant W. Anderson, Clemson, S. Car.; Hubert Schmidt, College Station, Texas; and I. D. Wilson, Blacksburg, Va.

Projects under study are coccidiosis in cattle, internal parasites of cattle, and Johne's disease. Dr. Boughton and Mr. Bowman in their study of coccidiosis are

of control of parasites are necessary if there is to be a marked general increase in the quality and quantity of livestock produced.

Dr. Johnson and Mr. Cox are studying Johne's disease. Their principal efforts up to the present time have been concerned with developing satisfactory media for growing these organisms in the laboratory so that johnin may be produced in commercial quantities. They have given some attention to the use of johnin as a diagnostic agent.

While paratuberculosis is not at present a very serious disease in the southeastern states, it is realized that it is gradually



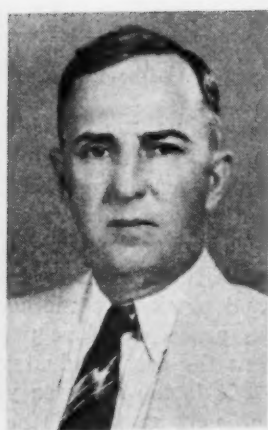
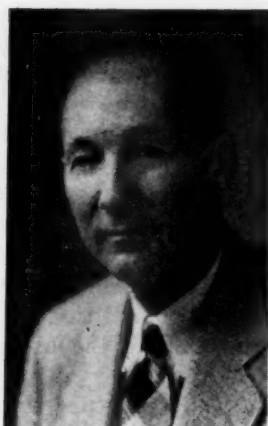
Main buildings of the Regional Laboratory for Animal Disease Research at Auburn.

identifying and attempting to isolate the different species found in cattle in the southeastern area. The first publication from the laboratory was a paper describing a new form, *Eimeria auburnensis*, which was first seen in a calf on the laboratory grounds.

Dr. Porter and Mr. Cauthen are working on internal parasites of cattle with particular emphasis on stomach worms and lung worms. It is recognized by all parasitologists that the types of soil temperature and rainfall of the southeastern area are conducive to severe parasitic infestations. While many successful livestock projects are under way in this area, better methods

becoming more widespread and that it probably will become serious in the future, unless better methods of control and eradication are discovered. This disease was selected as one of the problems for study, with the idea of trying to work out control and preventive methods which can be put in practice before paratuberculosis threatens the cattle industry of the South.

It is too early as yet to report any significant results of the work in this laboratory. The support which it is receiving from the experiment station directors, the veterinary profession and the livestock owners augers well for its future.



These are the

State Veterinarians

*in Zone 3**

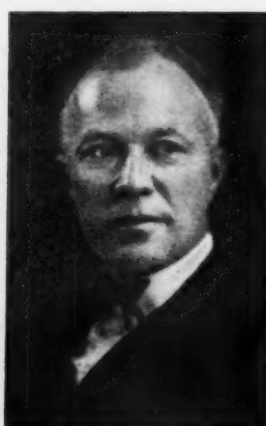
Top (left to right): T. O. Booth, Texas; E. S. Brashier, Mississippi; E. P. Flower, Louisiana; J. V. Knapp, Florida. Center (left to right): W. K. Lewis, South Carolina; Wm. Moore, North Carolina. Bottom (left to right): D. H. Ricks, Oklahoma; C. D. Stubbs, Arkansas; J. M. Sutton, Georgia; A. C. Topmiller, Tennessee. (The portrait of I. S. McAdory, state veterinarian of Alabama, appears elsewhere in this issue.)

*See page 657.

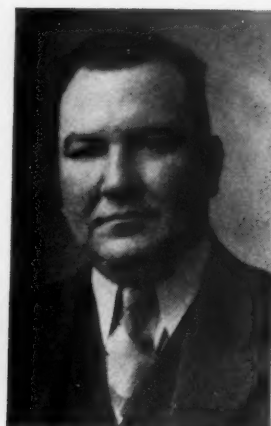
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State Association Presidents in Zone 3



Top (left to right): E. D. Clawson, Florida; D. Coughlin, Tennessee; W. F. Hayes, Texas. Center (left to right): A. A. Husman, North Carolina; G. D. Ingram, Alabama; J. D. Jones, Louisiana; D. O. Kitchen, South Carolina. Bottom (left to right): M. J. Luster, Mississippi; C. H. McElroy, Oklahoma; Lee T. Railsback, Arkansas; J. L. Smalley, Georgia.



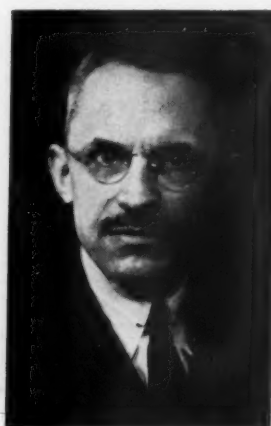
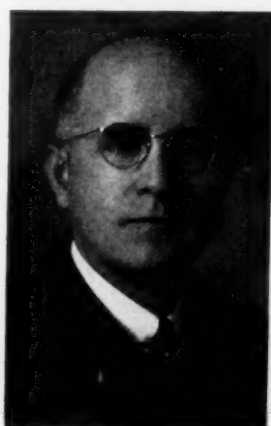
Left to right: J. H. Brown, North Carolina; V. L. Bruns, Florida; E. H. Durr, Mississippi; F. O. Garrett, Arkansas.



C. M. Hefflin, Louisiana.

*State Association Secretaries in Zone 3**

(The portraits of I. S. McAdory and A. C. Topmiller, secretaries of the Alabama and Tennessee associations, appear elsewhere in this issue.)

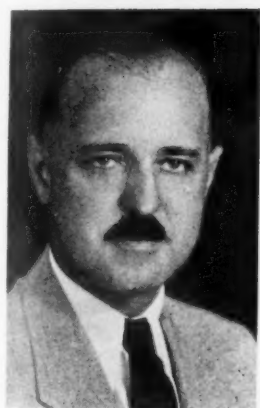


Left to right: R. A. Mays, South Carolina; F. Y. S. Moore, Oklahoma; J. E. Severin, Georgia; M. B. Starnes, Texas.

*See page 657.



Above: W. L. Gates, Mississippi.



A. V. M. A. ***Resident Secretaries*** ***in Zone 3***

(The portraits of J. H. Brown and R. L. Mundhenk, resident secretaries for North Carolina and Alabama, appear elsewhere in this issue. A picture of R. W. Williams of Arkansas was not available.)



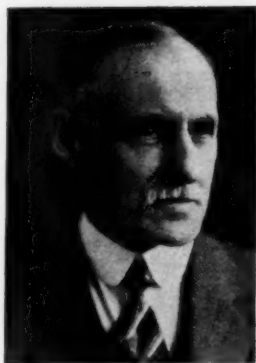
Below: W. T. Oglesby, Louisiana.



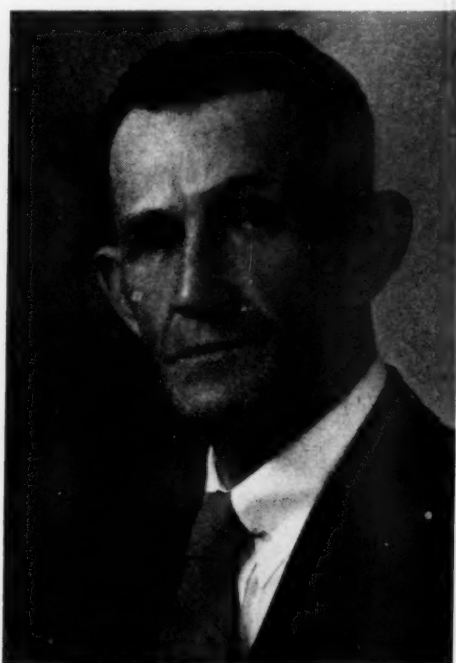
Above (top to bottom):
W. A. Barnette, South
Carolina; M. W. Emmel,
Florida; J. Gilbert Horning,
Texas.



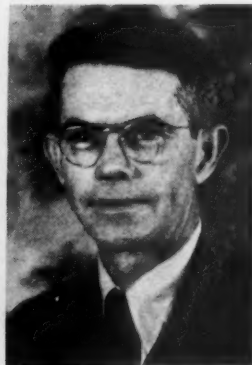
Above (top to bottom):
S. E. Douglas, Oklahoma;
John H. Gillmann, Tennes-
see; Charles C. Rife,
Georgia.

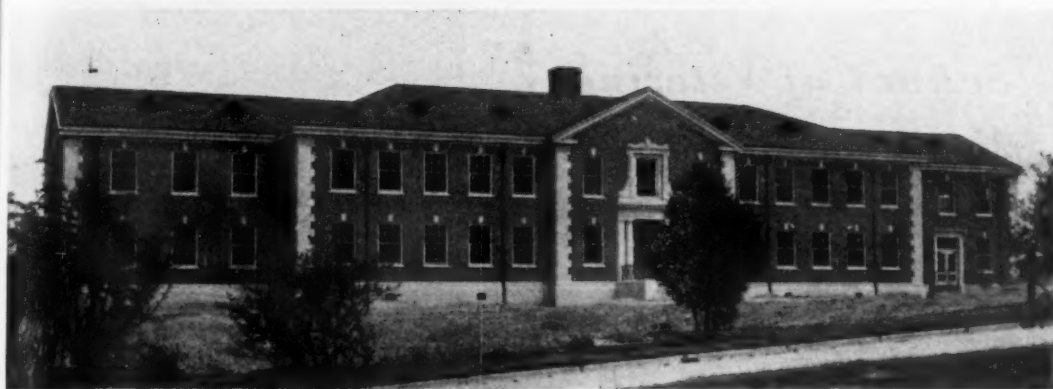


Veterinary Faculty
ALABAMA POLYTECHNIC
INSTITUTE



Top (left to right): Wm. E. Cotton, James E. Greene, W. M. Howell, Richard I. Kearley. Left: Dean I. S. McAdory. Above (left to right): Mildred Moore (B.S., M.S.), R. L. Mundhenk. Right: M. O. Robinson. Bottom (left to right): L. E. Starr, J. L. West, E. S. Winters, F. P. Woolf.





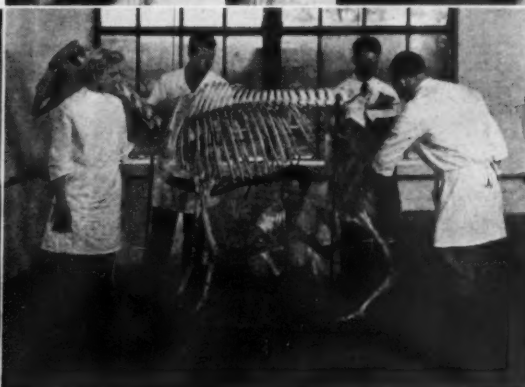
***School of Veterinary
Medicine, Alabama
Polytechnic Institute,
Auburn, Ala.***

Top: New \$200,000 veterinary school building, completed April 3, 1940.

Above: Large animal clinic.

Right: Class in bacteriology.

Bottom: Bacteriology laboratory in the new veterinary building and (right), class in osteology.

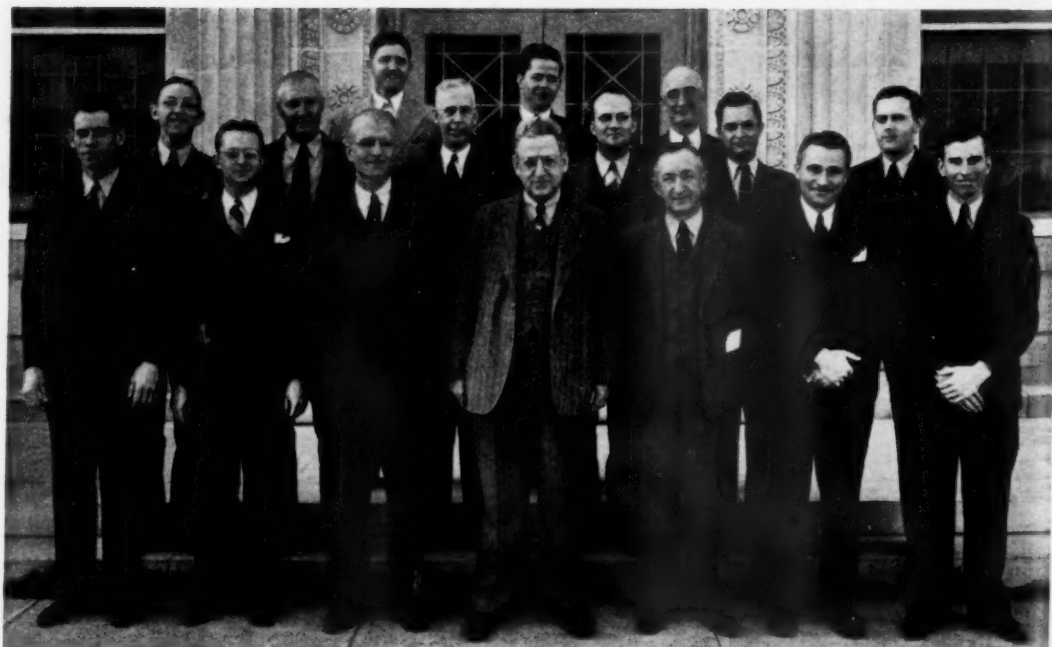


School of Veterinary Medicine, Texas A & M College, College Station, Texas

This school of veterinary medicine was established in 1916 and classes were started in the fall of that year. Its organization comprises six departments: Anatomy, hygiene, medicine and surgery, pathology, parasitology, and physiology and pharmacology.



Dean Ross P. Marsteller



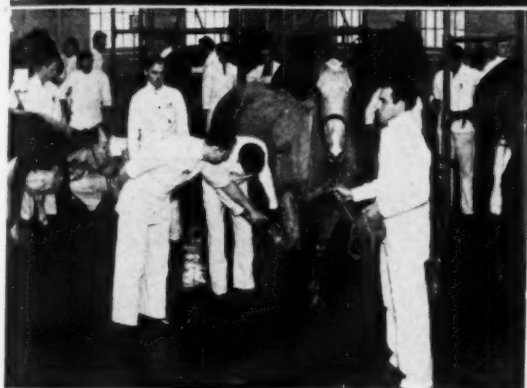
VETERINARY STAFF OF THE SCHOOL OF VETERINARY MEDICINE, TEXAS A & M COLLEGE, AND THE VETERINARY SCIENCE DIVISION, TEXAS AGRICULTURAL EXPERIMENT STATION

Left to right, front row: Carl Fink, James R. Ketchersid, August A. Lenert, Ross P. Marsteller, R. Clark Dunn, Stephen W. Lange, Henry P. Shoeman. Middle row: Herbert I. Ott, Hubert Schmidt, Horatio L. Van Volkenberg, Patton W. Burns, Harold M. Spangler, Terry G. Ozier. Back row: John H. Milliff, George T. Edds, Thomas S. Leith. (The following were not available for the picture: Fred P. Jaggi, Jr., B. L. Warwick, R. D. Turk, Hilton A. Smith, I. B. Boughton, W. T. Hardy, J. J. Reed, P. L. Piercy, C. A. Woodhouse and Frank P. Mathews.



Top: East view of the veterinary hospital at Texas A & M College. This hospital is one of the largest and most modern in the country.

Left: Large animal clinic.



Right: Class scene in the milk-inspection laboratory.

Bottom: Anatomy building and (right) students studying poultry diseases in the necropsy laboratory.



The Angleton Station Animal Disease and Parasite Laboratory

A RECENT addition to the facilities of the Texas Agricultural Experiment Station is a new laboratory erected at a cost of \$41,000. It is located on the grounds of the Texas substation No. 3 at Angleton, Texas. Construction of the laboratory resulted from efforts put forth by various organizations, including the State Veterinary Medical Association of Texas and the Houston Veterinary Association.

The structure is 43 ft. by 100 ft. with a concrete foundation, face-brick wall and

nary profession in Texas are expected to be answered by one or more of the following who make up the staff at the laboratory: J. J. Reid, D.V.M., pathologist, working on toxemia of range cattle; Paul L. Piercy, D.V.M., in charge of anaplasmosis investigations; C. A. Woodhouse, D.V.M., parasitologist, working on stomach worms of cattle; O. W. Olsen, Ph.D., parasitologist, U.S.B.A.I., working on liver flukes of cattle.

Hubert Schmidt, chief of the division of veterinary science, Texas Agricultural Ex-



—Cut courtesy of *The Texas Veterinary Bulletin*.
New animal disease and parasite laboratory at the Angleton station.

lined on the inside with 8-in. sani-finish tile. The partitions are of 4-in. sani-finish tile, and the floor of concrete with a 1-in. terracotta topping. Natural gas is used to heat the building. The laboratory is divided into approximately four equal areas by two 6-ft. hallways, one lengthwise and one across, thus completely dividing the building into four distinct laboratory units. Each unit consists of two small laboratories of convenient size. Two of the laboratory units are each connected with a room for small animals. The entire laboratory has been designed and equipped primarily for conducting research in animal diseases.

Many of the disease problems confronting the livestock industry and the veteri-

periment Station, A & M College of Texas, is director of the laboratory.

According to the University of Minnesota the feed requirements of a horse for one year are: An acre of pasture for each 1,500-lb. horse, 2 tons of hay and $1\frac{1}{2}$ tons of grain. At present feed prices, this would make the total feed cost per horse per year approximately \$40.00.—*Hoard's Dairyman*, April 10, 1940.

The United States weather bureau maintains over 6,000 observation stations throughout the country.

Mule Practice in the Sugar Cane Belt*

By J. ARTHUR GOODWIN, D.V.S.

New Iberia, La.

OUR DECISION to cast our lot in the Sugar Cane Belt of Louisiana some 35 years ago can well be judged as a pioneer effort, since a graduate veterinarian at that time was the cynosure of all eyes and presented an attraction comparable with some side-show feature, or a Kick-a-poo Indian medicine vender. Let it be noted that the confidence evinced towards the "new horse doctor" was anything but encouraging, any many times we felt that we had spent our three years at college in vain. We well remember our first client, who apologized for sending for us because of his own illness; otherwise (as he explained) he would have treated the animal as he always had done, and as his forefathers had done. This sense of self-dependence is an inherent trait in the majority of the people of this section, since they are descended from sturdy pioneers who left France because of oppression and landed at Nova Scotia, and subsequently were driven out by the British to find a haven in southern Louisiana.

The mules used on the sugar plantations vary in weight from 1,000 to 1,450 lbs., depending upon the type of soil, but those averaging 1,300 lbs. predominate. Here, as elsewhere, they are subject to all of the equine ailments, such as influenza, shipping fever, pneumonia, forage poisoning, swamp fever, periodic ophthalmia, all of the forms of colic septicemias, encephalomyelitis and anthrax. The state at one time was the dumping ground for horses affected with glanders, and the writer remembers, while in attendance at college, the cry of the auctioneers at the Kansas City markets to "throw him in the southern division" when an animal with a pasty nose passed through the auction ring without a bid. The passage of stringent laws requiring the destruction of affected animals, and rigid inspection of all animals entering the state

has entirely eliminated this scourge, and the writer has not encountered a single case of glanders in fully 15 years.

INFLUENZA

We rarely get the opportunity to apply prophylactic measures against influenza because practically all of the animals are shipped in, and those which are susceptible either arrive with the disease in the first stages or in the incubative stage. As a treatment, we have found that large doses of equine influenza bacterin (mixed)—from 5 to 8 cc. given at two-day intervals—are a distinct aid in combating this trouble. In the more severe cases we resort to the intravenous injection of neosalvarsan, using 4.5 Gm. (70 gr.) in 20 cc. (5 dr.) of distilled water, repeated in two days if necessary. In this mild climate pneumonia and pleurisy nearly always appear as complications of influenza and, while the incidence is not high, the termination is usually fatal.

FORAGE POISONING

Forage poisoning may occur at any time of the year and can be linked with the feeding of mouldy corn or mouldy hay. Should it occur during the months of July, August and September, a differential diagnosis is made from encephalomyelitis by the number of cases present, and by definitely locating the mouldy feed. If the feed is responsible for the trouble, several cases will develop at the same time, whereas we have found that encephalomyelitis attacks one animal at a time, and always horses first. It is only occasionally that we have outbreaks of this trouble, as owners are now aware of the danger resulting from feeding mouldy feeds.

At this point it might be well to mention the empiric treatment employed by the "traiteurs" of this malady and encephalomyelitis. Traiteurs, by the way is the name of a horde of self-styled

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"doctors" who move about in the medical as well as the veterinary field giving freely of their guaranteed remedies and cures to the gullible, and causing no end of trouble for those of us who, guided by scientific training, endeavor to effect cures in a rational way. They make no charges for their services or advice—"just giving a neighbor some help"—but as they are usually called in first, it can readily be seen what a menace they are, and how often it is impossible to undo or overcome some of the treatments they have begun. If the animal is down, they call for a plank and an ax or sledge hammer, whichever is the most convenient. The plank is placed over the forehead lengthwise and held in place by an assistant. The *traiteur* then rolls up his sleeves and with a well-directed blow with the back of the ax or sledge, in the region of the parietal crest, administers the treatment. If the animal fails to rise, then the case is pronounced hopeless.

SWAMP FEVER AND PERIODIC OPHTHALMIA

Swamp fever and periodic ophthalmia occur to a limited extent, and we must confess our inability to cope with these diseases. The only cases we have observed to recover were those in which there was some doubt about the correct diagnosis.

COLIC

Colic is present in all of its forms, and our losses compare favorably with those encountered elsewhere. In brief, we lose entirely too many, which demands that we make every effort to improve our methods of treatment. Our armament consists of the stomach tube, hypodermatics, anti-ferments, trochar and cannula, empty and filled capsules. Invariably we give first a hypodermic injection of pilocarpine, as we believe it good practice to stimulate the intestinal secretions and enhance the fluidity of the bowel contents in any type of colic. If there is evidence of gastric flatulence, the tube is passed at once, and 1 oz. of formalin in 3 to 5 gallons of water is pumped into the stomach and alternately siphoned. If there is borborygmi present, we follow in 15 to 30 minutes

with a hypodermic injection of arecoline hydrobromide, and most of these cases, after passing a quantity of flatus and excrement, make a good recovery. If, however, the animals become ill while at rest, with the history showing nothing out of the ordinary—no overfeeding, no previous overwork, with a slow or mild onset—these cases should be observed with caution in either diagnosis or prognosis because they present a very pronounced sinister aspect. There is no elevation of temperature, no tympanic condition, the pulse and respiration are normal, the conjunctiva is normal, there is very slight if any borborygmi and, to further confuse the diagnosis, the animal will occasionally nibble at food. As the case progresses, it soon becomes apparent that a bowel stasis is present with progressive strangulation, and the autopsy reveals a section of the small intestine from 3 to 20 ft. long in a gangrenous condition, almost devoid of food and filled with black, clotted blood.

We have used at times in these cases 45 Gm. (1.5 oz.) of chloral hydrate in 500 cc. (1 pt.) of sterile water administered intravenously with a gravity outfit; however, we would not recommend this as a routine treatment. We recall finding only a very few cases where a thrombosis of the anterior mesenteric artery was responsible for the strangulation, which leads to the conclusion that the majority of these cases are due to volvulus or intussusception.

SEPTICEMIA

As a result of contact with all kinds of sharp objects, such as nails, barbed wire, fork tines, soy bean and cane stubble, septicemia sometimes sets in on the various parts of the body and, depending upon the time of year, must be differentiated from anthrax. The line separating these two diseases when anthrax is prevalent, and when horse flies and deer flies are in evidence, is poorly defined. Anthrax is a septicemia, but as we speak of it as a specific type, it will be treated later in this article under that heading. We often find the animal with a temperature of 105° F. or over, and if we can locate a puncture at or near the seat of swelling, the trouble

is generally attributed to the streptococcus, with little chance for error. We have found that the intravenous use of 100 to 125 cc. (3.3 to 4 oz.) of a 1 per cent solution (aqueous) of mercurochrome, given at 48-hour intervals, will bring about recovery in most of these cases. Sometimes the treatment is repeated in 24 hours if the temperature is found to be over 105° F.

We are aware of reports that sulfanilamide is useful in treating these cases, but as yet we have not had a case in which it seemed expedient to risk this drug in preference to the treatment usually employed.

ANTHRAX

Anthrax occurs during the late summer months due to the failure of some of our people to use the necessary precautions. It is generally conceded that anthrax as it prevails in the South is of the most virulent type, and fortunate indeed are we practitioners who have recourse to an efficient means of immunization at a nominal cost. We use the intradermal method of immunization entirely, first injecting 0.5 cc. of a No. 3 spore vaccine in the left side of the neck, then following in 14 days or later with a like quantity of a No. 4 spore vaccine in the right side. Animals being vaccinated for the first time often exhibit a reaction at the site of injection, showing a swelling from 6 to 10 in. in diameter and an elevation in temperature of from one to three degrees. Our reason for following this routine is thus explained. Should a client report a swelling on one of his animals, its location contributes the information as to whether it is due to the vaccine. If it is and if the appetite is normal, we advise that the surface be bathed with hot salt water several times a day. Usually the swelling disappears in three days and the animal is put to work. This method of immunization against anthrax has proved reliable in our hands, and we do not recall a single instance where it has failed to protect. We use a small 2-cc. Record pattern syringe, glass barrel with metal plunger, divided into 0.5-cc. graduations, and a 24-

gauge intradermal needle one-quarter in. in length. The thickness of the derma varies, depending upon the breeding of the animal, but by keeping the syringe parallel to the body, and with a little practice, there is virtually no danger in injecting the vaccine subcutaneously.

We are privileged to see and treat a few cases of anthrax each year, and intravenous medication is followed entirely. Depending upon the clinical symptoms and temperature, we use either anthrax serum, 100 cc. to 300 cc., or 125 cc. of a 1:2,500 solution of metaphen. Our observation has been that in these cases a tolerance is often acquired for either preparation, as evidenced by a rise in temperature, in which case we alternate the treatment, with better results. We have lost several cases by terminating the treatment too soon after observing that the temperature, pulse and respiration were back to normal. In such patients one more treatment is now given, with better results. A chart of the daily temperature, pulse and respiration is kept and we try to visit the cases daily at approximately the same hour.

"COMBINED PROPHYLAXIS"

Several years ago it occurred to the writer to make an effort to prevent some of the principal ailments affecting mules on the plantations, rather than to try to effect cures. Accordingly, we have worked out a plan or routine, based on prevention, that has proved its worth. We have given it the name "combined prophylaxis," which means that we administer some of the necessary treatments for the prevention of ailments in advance of their onset. The good results are markedly manifest where the animals are housed, fed and worked under the proper conditions. We begin in the spring by thoroughly fasting the animals for 30 to 36 hours and administering a C-D capsule for bots, giving one of 5 dr. to each of the medium-size mules, and one of 6 dr. to the larger ones. At the same time we administer the first intradermal vaccine for the prevention of anthrax. We often have been asked if it is dangerous to administer the two treat-

ments simultaneously, in answer to which we can say definitely that it is not.

Since the C-D bot capsule has finished its work in two to three hours, and the absorption of the vaccine has hardly begun in 24 hours, it can readily be seen that a clash does not occur and, thus, two very important preventive measures are handled in one visit. There is another reason that we choose to administer the vaccine at this time, and that is for its highly tonic effect. It must be remembered that this No. 3 anthrax vaccine is of high potency, and should it be injected subcutaneously, without the necessary complement of anthrax serum, into a highly susceptible animal, a case of anthrax is certain to result.

Beyond the observation that the vaccine exerts a positive tonic action, we shall not attempt to explain its efficacy, except that we know that live, attenuated bacilli, such as the anthrax spores, introduced into the system set up increased phagocytosis. It has been our experience that, following this treatment, the animals shed their winter coats much more quickly and take their true color much earlier.

At the end of two weeks, we again visit the plantation. In accordance with our previous instructions to the owner, the animals at this time have been fasted for 30 to 36 hours. We administer a No. 10 capsule of carbon tetrachloride for the expulsion of worms, and give the final dose of anthrax vaccine. It will be noted that we again combine two important prophylactic measures in one visit, which helps to reduce the cost of the service, an item, we can assure, is carefully watched in plantation management. It must be noted that these treatments are applied at a time of the spring when the field work is the heaviest, and even in those animals treated for the first time, there is great improvement. The treated animals remain in excellent health and condition throughout the year.

The crops are generally "laid by" between June 15 and July 1, after which we do the dental surgery. As most veterinarians know, this type of surgery requires not only brain but brawn, and it is the bane of those engaged in large animal

practice. Yet, if one is interested in retaining whatever good reputation he may have acquired, he must give the proper dental attention to those animals intrusted to his care. This we do annually, regardless of their condition. We regard it as of the utmost importance that animals be able to masticate their foods properly, and this they can not do without the necessary periodic dental attention.

It will be noted that these prophylactic measures embrace five separate and distinct applications, and in order to keep records of this work, we use a portable card index in which the name, address, date of service, kind of service, number of animals, etc., are written. As we are in frequent contact with these animals and get to know them almost by name, and inasmuch as it is group treatment, it is not deemed necessary to have a card for each animal. Before the advent of a suitable balling gun the work of administering these capsules to large number of horses and mules was not without the element of danger, since they had to be given with the hand. This operator sincerely thanks the instrument makers for giving us a most valuable adjunct for this work.

The average life of mules on sugar-cane farms is approximately nine years under the "hit or miss" plan or, rather, the feed and work plan. However, the writer is convinced from experience that this "combined prophylaxis" alone will add from five to ten years to their usefulness, which is quite an economy in view of the fact that their value ranges from \$250 to \$325 each at 4 years of age. We often tell our clients that in the final analysis the services we render, including all of the medicine, vaccines and dental surgery, do not cost them a penny. Unbelievable as this may sound, it is nevertheless true. When the animals are fasted for the bot and worm treatments, at least four feeds, or two rations, are saved, since sugar-cane farms omit the morning feed, feeding at noon and night only. Thus, begin the entries on the credit side of the ledger, and by the elimination of the bots and worms, it becomes evident that all of the ingesta is converted to the animal body, instead of a portion being

robbed by intestinal parasites. Add to this the proper mastication of all foods, including increased or improved digestion and assimilation, the system toned up with a valuable tonic, and you have, as a result, a healthy, serviceable animal free of stomach and intestinal ailments, ready at all times to work. It is difficult to determine the true amount of savings for this service; it may range all the way from the cost of the service itself to the full value of the animal, to say nothing of the increased efficiency obtained.

EFFECT ON THE TEETH OF FEEDING BLACKSTRAP MOLASSES

Blackstrap molasses, a by-product of the manufacture of cane sugar, constitutes a large part of the daily ration fed the mules on cane farms. We have been asked whether this product has any deleterious action upon the teeth. The writer is of the opinion that this molasses is not harmful in any way to the teeth of mules, since it has been observed that caries, alveolar abscesses, and other irregularities occur just as often in those not fed molasses. We often see mules well over 20 years of age which have received molasses in the ration continuously since they were brought to the plantation, with perfect sets of molars and incisors.

FARM MOTORIZATION

In a true sense, the question of farm motorization should not enter into the discussion of problems in mule practice, but because it is becoming a vital economic question—Tractors vs. Mules—and because it is gaining importance in the Sugar Cane Belt, the competition existing between these two forces can not altogether be ignored. The writer has not at any time been obsessed with any phobias concerning the advent of tractors, and while it was freely predicted 30 years ago that the automobile would make the horse extinct, the latter is not yet ready to take its place in either the Smithsonian Institution or the Museum of Natural History. The same may be said of the mule on the sugar-cane farm. The consensus among the most rational of the large cane growers is a combination of the two,

and this seems to be the general opinion in the Sugar Cane Belt. It can not be denied that large numbers of mules have been replaced with the tractor and in a number of cases with efficiency and economy, but if the replacement is carried out in its entirety, with every tractor replacing 20 men, it can be seen readily that a vast number will be added to the already swollen unemployment and relief rolls. The tractor is positively not an economic factor on the small farm, since its initial cost, the interest and carrying charges, and its deterioration and repair costs are out of proportion to the farm income, and only in rare instances, where it is purchased on the community or family plan, can it be used to advantage.

The high price of mules is the principal reason for the rapid introduction of tractors on the cane farm, as it does not admit of argument that 4 horse power will equal 14 at the same price. Most of us know the reason for this high price: Demand and supply—a scarcity brought about by the breeders through the fear that they would not be able to market their product. The remedy lies in the breeding of more mules at a lower price and this suggestion is respectfully submitted to the Horse and Mule Association of America, for consideration in their campaign to raise more and better horses and mules for the nation. We in this section have already made a start in that direction by importing a number of average jacks. The large plantations are not adapted to keeping brood mares or raising colts; hence, this work must be done on the small farms, and the one lilting note in these discordant sounds is the fact that the writer can easily count 200 mule colts within a radius of 15 miles of the place called home.

There are 125,000 commercial fishermen in the United States, including Alaska. Their equipment is valued at about \$200,000,000 and they catch around 4 billion lbs. of fish annually, which is a mass of edibles on the market in competition with products of the farm. The figures are taken from reports of the federal department of commerce.

Poultry Diseases in the Southern States*

By M. W. EMMEL, D.V.M., M.S.

Gainesville, Fla.

IN GENERAL it may be said that poultry diseases as they occur in the southern states are fundamentally similar to those occurring in other states. However, there are various points of difference in the expression of a number of manifestations commonly encountered. It is the purpose of this paper to discuss briefly some of these differences. While this discussion may apply to poultry diseases in the southern states in general, it is applicable particularly to the southeastern states, with which the author has had direct or indirect contact.

PARASITIC DISEASES

Perhaps the most important disease problem in the South is that of parasitic diseases. Both internal and external parasites, with particular emphasis on the former, are more acutely ever-present in the southern than in the northern climate. The usually mild winter and the long summer seasons create favorable environmental conditions for the completion of the life cycles of various parasites during practically all seasons of the year. Consequently, the poultryman must continually exercise measures designed to control parasites throughout the entire year.

The long summer season, which in Florida includes the rainy season, is conducive to chronic intestinal parasitism. During the summer the intestinal parasite burden often gradually increases to a point at which the physical resistance of the bird finally is reduced, with the result that secondary respiratory diseases occur. This reduction in resistance occurs most frequently during the fall months. From an economic point of view this is a serious situation, since at this time of the year the bird should be in a healthy and vigorous condition in preparation for laying during

the high egg-price season. Treatment with reliable worm remedies only immediately relieves the acuteness of the problem. However, a period of four to six weeks often is required for the bird to regain physical fitness.

RESPIRATORY DISEASES

Second in importance to parasitic diseases as far as incidence is concerned is respiratory diseases. These diseases occur frequently following lowered resistance in association with fowl pox, chronic parasitism and perhaps other diseases. Uncomplicated respiratory diseases are of common occurrence particularly during the winter months, since climatic conditions at this season are more changeable than during other seasons of the year.

Contrary to a general belief among the laity, fowl cholera and fowl typhoid do not occur as frequently in the southern states as is suspected. Over a period of nine years only six outbreaks of acute fowl cholera have been observed. Instances of chronic fowl cholera have been encountered more frequently but have not been particularly numerous. Both types have yielded promptly to strict sanitary measures, even though in some instances the surroundings did not lend themselves readily to such a program.

There is one disease which occurs in Florida, only during the rainy season (summer months), which has not been observed in other southern states and which, as far as is known, has not been reported in the literature. The disease often is called "cholera-like disease" on account of the similarity of the symptoms to those of acute cholera. The disease is acute and the mortality is usually high. Recovery from symptoms is rare. The comb and wattles usually become dark and congested. The bird appears indisposed. The duration of illness is commonly less than

*From the Florida Agricultural Experiment Station.

twelve hours. Flock treatment with 20 per cent dried whey added to the regular ration for a period not to exceed seven days stops the mortality almost at once. As far as is known, the disease has not reappeared in flocks during the same year. Bacteriological examinations of the tissues of affected birds have given negative results. Since climatic conditions during the season in which this disease always occurs are extremely favorable for the growth of fungi, it appears possible that intestinal mycosis may be a factor in the development of the disease.

Mortality exacted by fowl pox is extremely low, although that occurring as a result of the development of secondary diseases, particularly respiratory diseases, is usually high. Since intestinal parasitism is a major problem and often begins to appear early in growing chicks, it is recommended that fowl-pox vaccination be performed early so as to reduce, as far as possible, post-vaccination difficulties resulting from reduced resistance induced by parasite burdens.

"Sod-disease" is commonly encountered in the southern states. The dorsal surface of the digits becomes covered with a hard scab. The phalanges often slough at the articulations and in severe cases it is not uncommon for the entire foot to slough, making it necessary for the bird to walk on the distal end of the metatarsal bone. The disease occurs only in young chickens and turkeys that are allowed to run on dew-covered grass during the early-morning hours. The author has been able to isolate repeatedly a fungus from the affected parts. It is thought that the dew softens the tissues, allowing fungus infection to occur. Similar lesions have been observed on the ears of young pigs which were allowed to run in dew-covered grass. Keeping chicks confined until the grass has dried controls outbreaks of this disease.

CASES OF AVIAN TUBERCULOSIS SELDOM OBSERVED IN SOUTH

One unusual feature of the poultry-disease problem in the southern states is the low incidence of avian tuberculosis. During the past six years in Florida, only

three cases of tuberculosis have been observed, and two of these occurred in birds other than chickens. During three previous years in Alabama, cases of avian tuberculosis were seldom observed. When an exhibit of avian tuberculosis lesions was requested for the Atlanta meeting of the A.V.M.A. (1932), it was necessary to secure the specimens from a northern state.

EXCELLENT RESULTS OBTAINED IN PULLORUM-TESTING PROGRAM

There is still much opportunity for the expansion of pullorum-disease-eradication work in the southern states. However, in those states in which this program has been instituted, rapid progress has been made. In many instances, and particularly in Florida, poultrymen are dependent upon an outside source of hatching eggs, especially during the summer months. The results of pullorum testing have been so outstanding in many southern states that hatcherymen rapidly are becoming educated to purchase eggs only from pullorum-free stock and poultrymen are demanding chicks from pullorum-free sources.

TURKEY INDUSTRY PROSPERING

The turkey industry in the South is rapidly expanding. During the past few years the shipment of early hatching eggs from Florida to northern hatcheries has shown potentialities of developing into a large and lucrative business. At the present time southern turkeys are confronted with all of the hazards that may confront turkeys anywhere.

CLIMATIC AND ENVIRONMENTAL FACTORS IN SOUTH FAVOR POULTRY PRODUCTION

While the mild climate of this region tends to enhance the disease problem, particularly in relation to parasites, there are also features pertaining to climate which can be utilized to advantage in the control of disease. Continued and abundant sunshine during the major portion of the year is a factor which may be responsible for decreased mortality among poultry in many of the southern states as compared with

northern states. When the southern poultryman is educated to put sunshine to work, many of his disease problems can be reduced materially. Another factor of importance is that the mild climate of the South makes it necessary to house birds less artificially than in the North. Thus, birds are housed under more natural conditions, which should mean greater health and vigor. With the exception of the areas surrounding some of the larger cities, the poultry population in the South is not as

dense as in the North. As a result, disease is not as easily or as rapidly spread. It also seems true that many of the soil types found in the South are conducive to disease control. The light, sandy, open types of soil with their excellent sub-drainage in the greater part of Florida are a typical example. The proper utilization of all of these factors has done much to reduce poultry mortality in this section of the country and, if judiciously used, can reduce it to a still further degree.

Airplane View of West Palm Beach, Fla.



In the left center is the Hotel George Washington, which will be headquarters of the annual meeting of the Florida state association in October 1940.

Coccidiosis of Domesticated Animals and Fowls*

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COCCIDIOSIS is an acute, subacute or chronic infectious disease of animals, with the exception of Equidae and possibly man. The few cases in which the oöcysts have been reported in man were thought to be due to accidental ingestion through contaminated food, and are probably of no significance.

Coccidia are small rounded, oval or ellipsoidal protozoa, their relative average size being approximately 12 to 18 x 12 to 25 μ in length and width, respectively. They are epitheliotropic. The capsule is double walled and is highly refractory to light. The oöcysts are widely distributed in nature and are capable of withstanding adverse conditions for rather long periods of time. The sporocysts, or the infective oöcysts, are more resistant than are the oöcysts. They are not affected by the usual disinfectants employed at the usual strength. Heat, 60° C. for a few seconds, however, destroys them. Pasture lands, especially low pastures, and poultry yards may remain infective for as long as one year after being free of susceptible animals and fowls. The usual mode of infection is feed and water contamination by carriers or chronically affected animals. Hay, fodder, etc., which have been grown on infected lands may be a source of infection. Stagnant pools and slow-running water are not infrequently reservoirs of infection and are a serious menace to the welfare of the animals.

A brief review of the life cycles of these minute organisms clearly shows why they are placed in the high-ranking position of pathogenic importance. The double-walled oöcysts, which are passed out in the feces, are internally composed of a uninucleated, spheroidal mass of protoplasm. Under proper conditions of temperature and moisture these develop into sporocysts, the

nucleus undergoing division and forming four elongated oval bodies, the sporoblasts. Each sporoblast divides once to form two sporozoites, or the entire capsule surrounding eight spindle-shaped bodies, encased in pairs in separate capsules in the instance of *Eimeria* species, and four sporozoites encased in two sporoblasts in the *Isospora* species. These bodies are now infective, the sporulating process requiring two or three days under normal climatic conditions.

The sporocysts are ingested by susceptible animals in feed and water contamination. Then, the capsule is dissolved by the digestive juices, particularly the pancreatic juice, releasing the sporozoites, which penetrate the epithelial cells of the intestinal mucosa. The sporozoites grow, assuming a rounded form and developing into schizonts. The schizonts give rise to banana- or spindle-shaped merozoites which escape from the affected cells, penetrate other normal ones and form schizonts. Such schizont to merozoite to schizont to merozoite formations occur for several generations, usually two or three, until finally the merozoites or a portion of them form gametocytes, ending the asexual cycle.

The gametocytes give rise to macrogametocytes, or the female cells, and the microgametocytes, or the male cells. Macrogametes and microgametes are formed, the latter being elongated and possessing two flagella at one end. The macrogamete is fertilized by the microgamete passing through a small opening at one pole, and subsequent fusion of the nuclei. The formed oöcyst completes the sexual cycle and passes out in the feces. It is not known why the asexual cycle ceases—whether this is due to a type of tissue immunity developing, or merely a physiological process which renders the disease self-limiting, provided subsequent reinfection is prevented. The latter is the theory generally accepted. Oöcysts are usually passed out in the feces the seventh day following infection.

*From the School of Veterinary Medicine, Alabama Polytechnic Institute; presented at the annual meeting of the Southern Veterinary Medical Association, Columbia, S. Car., November 9-11, 1939.

Coccidiosis may develop in stabled cattle during the winter months and it is characterized by dark, watery, slimy fetid evacuations which are or may become blood-tinged, or may be composed largely of blood, blood clots, fibrin and tissue débris. The anus may be partially open continually, there may be constant straining movements, and prolapse of the rectum is not uncommon. Febrile disturbances or manifestations frequently occur. Rapid loss of condition, anemia, dehydration, anorexia, cessation of production and retraction of the eyeballs into the sockets are the usual symptoms in the severe cases. Herds of sheep and goats frequently suffer heavy losses. The symptoms are not materially different from those of cattle. Young lambs may become affected with convulsive seizures and die quickly. Marked weakness and prostration are usually present. Rapid and marked abdominal distention quickly follows death. The incidence of coccidiosis in swine is rapidly increasing and in many parts of the country is becoming a major economic problem. Oöcysts have been detected in from 50 to 75 per cent of slaughtered swine by intestinal scrapings. Young swine are chiefly affected, showing symptoms of catarrhal enteritis which later becomes sanguineous.

Dogs, cats and fur-bearing animals are commonly affected. It is estimated that approximately 50 per cent of all dogs and nearly 40 per cent of all cats are chronically affected or are carriers. Fetid watery diarrhea later becoming blood-tinged, severe straining movements, anorexia, anemia, and febrile disturbances with heavy mortality, especially in young animals, are commonly seen. Outbreaks in rabbit hutches frequently solve the problem of overproduction and slow sales, and are usually associated with general insanitary conditions. Poorly ventilated, damp, dirty cages and contaminated feed and water containers especially invite catastrophies. Diarrhea, weakness, anemia, emaciation and bloody feces are the symptoms and the mortality frequently is from 90 to 100 per cent.

Poultry also are severely affected, with extremely heavy mortality. Young birds are generally affected with the acute cecal

type, resulting in bloody diarrhea and rapid death. Such affected birds stay huddled together with the eyes closed and the feathers ruffled and harsh, and move only when forced. Mature fowls are more often affected with the chronic type, which localizes in the small intestine, and the infection results in loss due to cessation of production, progressive emaciation, paralysis and, ultimately, death or humane destruction.

The lesions, taken as a whole, are those of a catarrhal hemorrhagic enteritis. In cattle the mucosa of the large intestine, cecum and rectum is corrugated longitudinally. The contents are fluid brownish red, and composed of blood, blood clots, fibrin and tissue shreds. Erosion of the mucosa occurs to a considerable degree. The walls of the intestine are thickened due to edematous infiltration. In swine the small intestine is chiefly affected, especially the jejunum. The mucosa is hemorrhagic, markedly denuded and congested. The contents are similar to those in bovine coccidiosis. The small intestine is the usual seat of trouble in sheep and goats. There are sharply defined white or grayish foci on the lumen of linseed size, representing the accumulation of the infection. The walls of the intestine are thickened, edematous, congested and covered with a slimy exudation. Lesions are not uncommon in the gall bladder and the liver. In dogs and cats the ileum and colon are primarily affected. Punctiform hemorrhages, catarrhal enteritis mixed with hemorrhage, desquamation of the epithelium and areas of secondary infection are evident.

In fowls there are two main types: The cecal or acute type, and the chronic type. The cecal type is characterized by enlargement, congestion, cyanosis, and hemorrhages visible through the mucosa externally, and in the very acute cases the ceca become filled with pure blood and, later, with a cheesy, necrotic plug in which there are streaks of blood. The chronic type affects the small intestine, which is thickened, edematous and covered with a catarrhal exudate. There may be small hemorrhages scattered over the surface, and small, whitish, fluffy areas or organized nodules the

size of a pin head firmly adherent to the mucous surface. Secondary changes are anemia and atrophy of the organs. Ascites, hydrothorax and hydropericardium are not infrequently seen.

DIAGNOSIS

The diagnosis of coccidiosis in cattle depends upon microscopic examination of fecal matter or rectal scrapings. The presence of a few oöcysts in a smear is probably of no significance as a large number of mature animals harbor these protozoa. The presence of a moderate to large number of oöcysts accompanied by symptoms of fetid watery or slightly sanguineous diarrhea, depression, cessation of rumination and lactation, and probably febrile disturbance clearly indicates a severe coccidial infection.

IMMUNITY

Immunity to a greater or lesser degree is usually established following recovery from an infection. As a general rule, the more severe the infection, the higher the degree of immunity. The acute type of infection confers a more rapid immunity than does the chronic or subacute type. The more deeply the parasites penetrate the intestinal walls, the greater and more rapid the immunity. Cross immunity is not observed; recovery from *Eimeria tenella* infection does not protect against infection with *E. necatrix*. Cattle, sheep and goats apparently do not develop immunity even following acute attacks, or else their resistance is transient and slight, as fatal infections may develop soon following recovery, even with the same species of coccidia. Swine develop a rapid and complete immunity but, unfortunately, this is rather transient. Dogs, cats and foxes are immune following recovery from an infection, and according to some authorities this immunity is permanent.

Fowls recovering from an acute attack of coccidiosis are for all general purposes permanently immune to reinfection with the same species but not to other species. The method through which immunity is developed is not well understood, but theories which have been advanced and

which appear feasible are: 1) The production of humoral antibodies as demonstrated by allergic intradermal reactions in animals sensitized or recovered from coccidiosis; 2) immunity by the replacement of a susceptible type of epithelial cells with a resistant type of cells; 3) local immunity involving physiological changes in the cells, macrophages, or both; and immunity induced by a bacteriophage-like material.

TREATMENT

Treatment is in general inadequate and ineffective. The resistance of the parasites to the action of the chemical agents is greater than that of the host cells or tissues. Some of the free sporozoites, merozoites and schizonts may be destroyed when free in the intestinal lumen, but these are insignificant as regards the course of the disease. The administration of astringents, protectives and antiseptics is beneficial in that it tends to constrict the cells. This more or less prevents penetration of the cells by the parasites and also keeps the parasites within the cells from escaping following a cathartic. Tannic acid, tannoforn, catechu, etc., given by the mouth, alum or tannic acid in 1 per cent solution by rectal injection, and mineral oil, mucilaginous agents, and adsorptive materials, such as charcoal, are beneficial. Doses of tannic acid or salicylic acid, 1 oz. each day for a bovine, or 1 oz. of creolin is worthy of trial. In small animals salol and bismuth products are frequently beneficial. Arecoline hydrobromide may break the asexual cycle, thereby allowing for more rapid recovery. In cases of severe intestinal hemorrhage, oxalic acid injected intravenously would probably be of value. Various arsenicals, such as atoxyl, injected intravenously, may occasionally give fair results. Attempts to establish immunity by feeding attenuated sporocysts have been encouraging, but at present the technic is not available for field application.

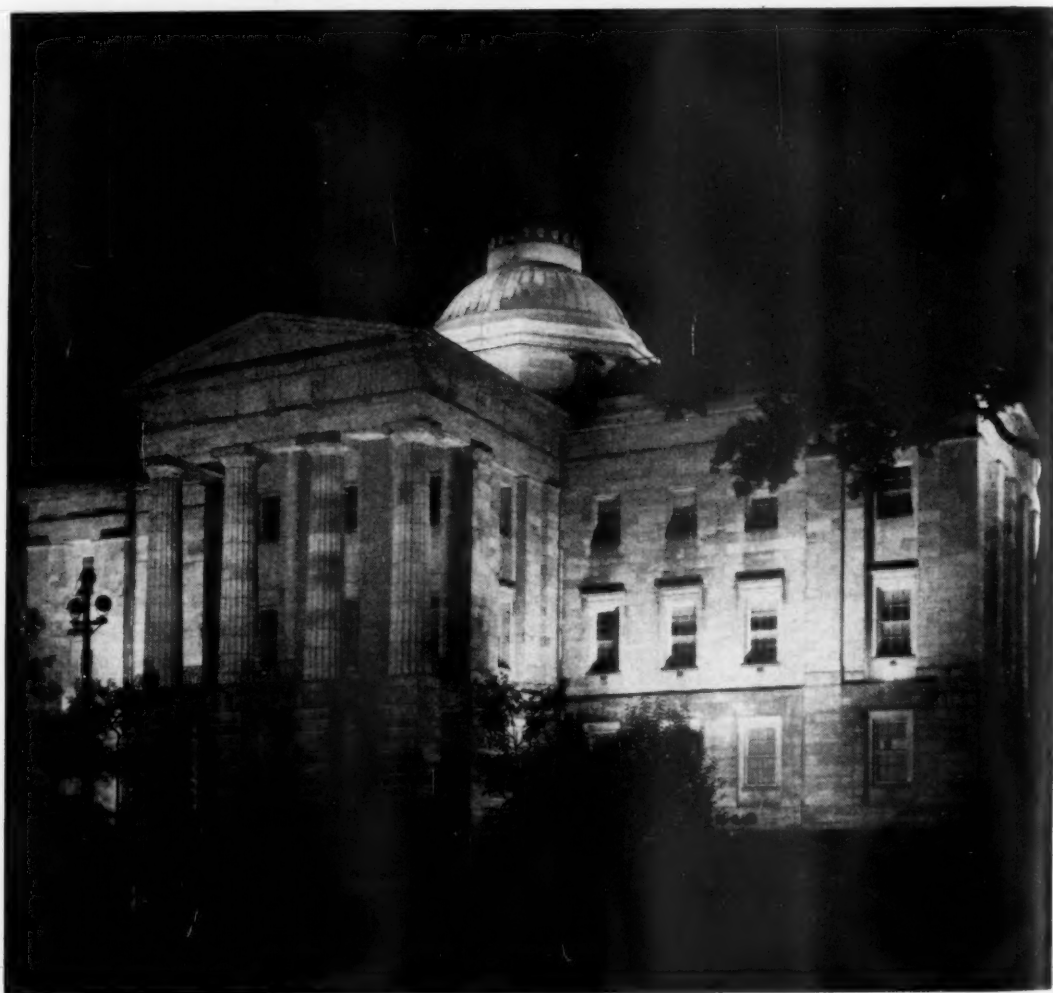
PREVENTIVE MEASURES

Removal to new quarters of noninfected animals at the first indication of the disease is advisable. The feed may be changed to

dry roughage and hay, which helps to retard the asexual development. The stalls occupied by infected animals should be cleaned and the manure placed in well-constructed manure boxes or spread thinly on fields in cultivation but never on pasture lands. A thorough application of boiling water to the stalls results in a fair to satisfactory degree of disinfection or, at least,

results in attenuation of the organisms. Fencing off stagnant pools, avoiding wet, low pastures and preventing feed and water contamination are measures necessary to prevent reinfection as well as the infection of the remainder of the herd or flock. If possible, infected pastures should not be used for at least six months or, preferably, one year.

The North Carolina State Capitol



Night view of the North Carolina state capitol building at Raleigh.

Existence of Tropical Variety of Cattle-Fever Tick (=Boöphilus Annulatus, Var. Australis) Complicates Tick Eradication in Florida

By J. V. KNAPP, D.V.M.

Tallahassee, Fla.

THE STATE livestock sanitary board of Florida was created by the legislature of 1923 for the purpose of undertaking as its major objective the elimination of the cattle-fever tick. Although tick eradication virtually started in Florida in the spring of 1915, very little progress was made, as no specific law was in effect for this purpose.

The Florida tick-eradication law was the first measure of its kind adopted by any state. This law made each cow responsible for her dipping rather than placing the responsibility on the owner, custodian, or person in charge, and instead of prosecuting owners for failure to dip cattle, the undipped cattle were apprehended by agents of the livestock sanitary board, dipped, and held subject to redemption by the owner on payment of the cost incurred by the state. Another unique feature of the law was that it provided a compensation to the cattle owner for the dipping of his cattle, and this was determined by the owners to be 3 cents per head per dipping, or an average compensation to the cattle owner of \$1.00 per head for the dipping period.

Tick eradication started in northwestern Florida and proceeded eastward to the Atlantic Coast, then southward down the Peninsula. The working area was always between the tick-free area to the rear and the tick-infested area in the foreground.

Tick eradication progressed in a highly satisfactory manner until the deer-tick-infested game preserves of Orange county were reached in 1931, where the usual plan of dipping cattle every 14 days failed. A second dipping campaign was undertaken in 1932, and this also failed. It was noted in the fall, during the hunting season in November and December, that the deer on the game preserves of Orange and Osceola counties were infested with the cattle-fever

tick, as were the cattle ranging on this and adjacent territory, despite the two dipping programs already completed.

Florida then called upon the U. S. bureau of entomology and plant quarantine and the U. S. bureau of biological survey for assistance. These departments conducted extensive experiments and surveys extending from June 1933 through the fall of 1937, and it was definitely determined by these agencies that: 1) The tropical variety of the cattle-fever tick, *Boöphilus annulatus* (var. *australis*) exists in Florida; 2) the tropical variety of the cattle-fever tick propagates on deer as well as cattle; 3) the deer of the protected deer-tick-infested swamp areas of Florida must be removed to effect tick eradication; and 4) other wild animals, birds and reptiles found in these deer-tick-infested swamps are not hosts of the cattle-fever tick.

The 1923 tick-eradication act did not authorize the slaughter of deer. Therefore, in 1937, the legislature passed laws authorizing the removal of deer in the swamp areas of Orange, Osceola, Highlands and Glades counties. This work was delayed by legal injunction until the spring of 1938. The deer were killed in 1938, the cattle later check-inspected and the quarantine lifted in Glades and Highlands counties. In Orange and Osceola counties the deer have been killed and the cattle are now being check-inspected preparatory to release from quarantine.

The legislature of 1939 authorized the removal of deer in the remaining deer-tick-infested swamp areas of the state, namely, Collier and Hendry counties, and the deer-reduction program in Collier county was undertaken on July 1, 1939, sportsmen being given the opportunity to kill the deer in these preserves until November 1, when the

work was taken over by employes of the state livestock sanitary board and the U. S. bureau of animal industry. The deer-reduction program in Collier county is proceeding in a satisfactory manner.

Preparatory to the inauguration of the program in Hendry county, which was authorized to begin November 20, 1939, a preliminary survey of the county was made and consideration given to the tick-infested deer on the Seminole Indian reservation, comprising some 55 sections of land, containing 40 to 50 Indians and an estimated 200 deer. Permission was requested from the Department of Interior to remove these deer by employing the Seminole Indians as paid hunters. On January 30, 1940, the Department of Interior refused to permit the deer on the Seminole Indian reservation in Hendry county, Fla., to be killed.

If Florida is not permitted to kill the

deer on the deer-tick-infested area of the reservation in Hendry county, there will remain in this state and nation a reservoir of cattle-fever ticks capable of spreading not only to the cattle of Florida, but to adjoining states as well.

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Florida State Agricultural Building



The offices of J. V. Knapp, state veterinarian, and the state livestock sanitary board have been housed in this building since its completion in 1938.

Nutrition and Its Relationship to the Veterinary Profession*

By D. M. WARREN, D.V.M.

Lancaster, Pa.

VETERINARIANS, who are trained in the matters of physiology, pathology and infectious disease control, should be in a position to better evaluate the benefits of a completely balanced animal ration than any other group of men. I feel that it is unfortunate that our profession, trained to judge animal response and behavior, has so overlooked the possibilities of contributing to the field of nutrition that agencies other than our own profession have been permitted to overshadow our efforts in this respect. We, alone, are responsible in a large measure for the fact that in many cases the breeder and raiser of live stock is forced to depend upon these other agencies for advice in solving his problems. I realize that a great deal of criticism is directed by veterinarians towards certain members of the state college staffs, of the extension service, of the field men connected with the various feed concerns, and of many government and state employes, because it is felt that these men usurp the veterinarian's rights. I grant that in certain instances this is undoubtedly true, but it is also true that the veterinary profession has not kept pace with the nutritional procedures which are accepted today by everyone interested in animal production. You may ask, "What difference does this make, as far as the veterinary profession is concerned?" My answer is that it does make and has made a great deal of difference.

Not many years ago the veterinarian was the last court of appeal, so to speak, that the farmer concerned with livestock problems could consult. Unfortunately, this is not the situation today. Now the farmer can call for assistance upon any or all of these other agencies. As a result, he does not consult the practicing veterinarian as frequently as he did formerly, because in

too many cases the practitioner is not well informed in matters of nutrition and is not in a position to answer the questions that are asked.

Today, no one can question the fact that there is a distinct correlation between animal nutrition and disease control. Many of the conditions which in the past were considered to be of infectious nature have been definitely established as being of nutritional origin. Unless we recognize these facts, we are apt to find that a slight change in the formula of a ration will frequently correct or improve a condition that we have been attempting to handle from an infectious disease standpoint.

The medical profession is to be commended for the able way in which they have kept control of every line of human development as far as health, nutrition, sanitation and disease control are concerned. It is noteworthy that they, as a profession, have permitted no outside influence to usurp control of factors which logically are related to their profession. It is unfortunate that the same can not be said for the veterinary profession.

With the foregoing in mind, I should like to review some of the well-known facts concerning animal nutrition as we know it today, and as it may apply to the work of the veterinary profession. Briefly, the basic requirements of a correctly balanced ration for all classes of live stock are:

- 1) That it supply enough of the needed food values;
- 2) that it be balanced in major food elements;
- 3) that it provide variety in order to assure balance in the various classifications of food elements;
- 4) that it be palatable in order to assure adequate consumption;
- 5) that it be digestible; and
- 6) that it assure a complete sufficiency

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of the vital factors, such as proteins, vitamins and minerals.

PROTEINS

Early in the course of nutrition studies it was found that the protein content of any ration might be used as a guide for computing the value of a ration. This method was the basis for judging the value of animal rations for a long time, and although it was an important step forward, we now know that it is an inadequate yardstick of measurement. As studies progressed, it was discovered that proteins are made up of amino acids. At present some 23 distinct amino acids are recognized, approximately ten of which are absolutely essential for growth, development and reproduction. In the light of this information, it becomes apparent that the quality as well as the percentage of proteins must be considered. Since all of the essential amino acids are not supplied in our native grains, protein concentrates must be fed.

A great deal has been said relative to the percentage of protein required in certain classes of livestock feeds and there has been a tendency on the part of many feeders, I believe, to use a too-high percentage of inadequate proteins—in many dairy rations, at any rate. We must recognize the fact, especially in dairy feeding, that from a genetic standpoint we are dealing with a complex piece of machinery. We have developed an animal which from a genetic standpoint is capable of enormous production, and unless we are exercising care in forcing this animal into production, we are apt to upset the delicate balance that should be maintained in the animal's body. This has been done many times, especially by feeding proteins improperly. Although the heavy feeding of proteins is not responsible, for example, for the cases of mastitis we find in dairy herds, their improper use has, nevertheless, so overstimulated the animals to temporary production that it has made them highly susceptible to the infectious agents which cause mastitis. This is a matter to which the veterinary profession should give serious consid-

eration when consulting with dairy-cattle breeders and feeders.

The whole subject of protein metabolism is a complicated one, and one that is important not only because proteins are expensive, but also because they are the basic portion of many rations, and unless supplied in proper quality and proper amounts, diminished production and increased susceptibility to infections will result.

CARBOHYDRATES

Carbohydrates are an essential part of all rations, but fortunately, with the abundance of native grains that are available, supplying them is not a problem for the average feeder. One must be careful, however, that the carbohydrate balance in the ration is not too high, since there is a great tendency to overuse carbohydrates at the expense of some of the more important nutritive materials. It must always be borne in mind that many carbohydrates are lacking in essential minerals and vitamins.

ROUGHAGES

The question of roughage, of course, must be considered. Due to intensive agriculture there is a tendency towards a reduction in the amount of roughage used in the average ration. This is unfortunate because we have bred our dairy animals for high production and consequent increased consumption. They are physiologically capable of utilizing a large quantity of roughage, and unless this is provided, digestive problems arise. I have found many cases where an improper amount of roughage was singularly responsible for digestive trouble, as well as for the inability of the animals to utilize concentrates.

Vitamins and roughages are closely related in that the latter contain many of the former.

FATS

The question of fats in the rations of all classes of live stock has received considerable attention. It is a problem that has not been solved in poultry feeding but it has been worked out reasonably well in dairy-cattle feeding. In order to compound

a proper dairy ration, we must approach a 4 per cent fat level. Below this there is an excessive drain on the animal body, and above this level nothing is to be gained. The quality of the fat that is used in any ration also must be given consideration.

MINERALS

Although proteins, carbohydrates, fats and roughages play an important part in the average ration, minerals and vitamins have an even more significant rôle.

According to B. W. Fairbanks of the University of Illinois, there are 13 mineral elements essential to animal life, namely, sodium, potassium, calcium, magnesium, sulfur, phosphorus, chlorine, iron, iodine, manganese, copper, zinc and cobalt.

Undoubtedly, future research may show other elements to be essential. Some of the elements listed in the original 13 are required only in minute amounts. The mineral used most widely is sodium chloride, that is, common salt, which, in cattle feeding, for example, must be provided at the rate of approximately 2 lbs. per month, over and above that contained in the feed.

Both calcium and phosphorus are essential to growth, production, and reproduction, and they should be used and maintained in approximately a 2 to 1 ratio. We are well aware of the importance of proper calcium metabolism in, for example, milk fever, but we are not as familiar with the condition known as calcium tetany. This affection occurs in calves (up to yearlings) and is the result of an excess supply of calcium with improper assimilation or, stated another way, a proper supply of calcium with an improper supply of vitamin D, because it is impossible to discuss calcium assimilation without also discussing vitamin D. One is dependent upon the other. This applies not only in calcium tetany, but also in rachitis. In poultry feeding, it is essential to supply rather large amounts of calcium for skeletal development and egg formation. Here again, vitamin D must be taken into consideration. The question of trace minerals is important with reference, for example, to cobalt, the lack of which is responsible for so-called salt or bush sick-

ness. The use of 1 mg. daily should correct this condition.

I am not entirely familiar with this particular area [southern states] but I doubt very much if there are many cases of iodine deficiency. If this observation is correct, the use of the ordinary, commercial iodized salt, which contains approximately 1.5 gr. of potassium iodide per pound, should be sufficient for normal needs. In areas where an acute deficiency is known to exist, an iodine deficiency can be corrected by the use of 6 oz. of potassium iodide per 100 lbs. of salt consumed. It is also a common practice where bone meal is used to supply phosphorus and calcium, to include the potassium iodide in this mixture. In this connection, it is wise to determine whether a calcium or a phosphorus deficiency exists, or both, before the feeding of bone meal is recommended, because there is the risk of carrying too high a phosphorus content into a ration where only calcium is needed.

In perosis, or slipped tendons, in chickens and turkeys, it is interesting to note that at one time this condition was thought to be due to an excess of calcium in the ration, whereas today we recognize the fact that as little as 1/80 of 1 per cent of manganese sulfate in the ration will correct and prevent the condition.

The weekly use of an iron and copper solution in the diet of suckling pigs will prevent or correct nutritional anemia. It is essential, however, that both of these elements be present. This is a good illustration, I believe, of the importance of a proper mineral balance in any ration, rather than just supplying indiscriminately any and all of the minerals that might be needed. I feel that the veterinarian has an opportunity in most sections of the country to offer to the feeder of live stock some constructive help in this particular problem. It is not one that should be left to the untrained person's judgment or opinion, since much damage may result from the misuse of these substances.

VITAMINS

In view of the fact that such an extensive and comprehensive amount of work has

been done with vitamins, vitamin nutrition is no longer a theory; it is an established science and must be accepted and given a place among the other principles of animal nutrition. At least eight vitamins have been isolated and their chemical structures established. This fact alone takes vitamins out of the theoretical state. So much has been written on this subject that it would be impossible in a paper of this type to discuss even one of the vitamins in detail. I shall attempt to point out only a few of the outstanding factors in vitamin usage which should be recognized by the veterinary profession and which will apply in the general field of animal behavior.

Vitamin A.—All of the functions of vitamin A are probably not yet established. However, there are certain functions for which this vitamin appears to be essential, namely: Normal growth, normal function of the eyes and normal structure and function of the epithelial tissues. Vitamin A also appears to have considerable bearing upon hatchability and reproductive performance. More work has been done on vitamin A in poultry feeding than in any other class of livestock feeding. This is due in part to the fact that fowls lend themselves to experimentation much more readily than do the larger animals, first from an economic standpoint and, second, because the life cycle is much shorter and the results can therefore be interpreted much more quickly.

The amount of vitamin A required by fowls for proper growth and epithelial resistance has been established by experimentation. If this unitage is lowered, either infectious respiratory trouble, due to lowered resistance, or the well-known nutritional type of respiratory disturbance will result. In a ton of poultry feed we use the following amounts of vitamin A: For starting baby chicks, 1,816,000 units; chicks for laying purposes, 7,264,000 units; and breeding stock, 10,896,000 units. Turkeys require approximately three times this unitage in their ration.

Most cod liver oil sold on the market contains 650 units of vitamin A per gram and 85 units of vitamin D. There are fortified

oils, of course, which contain much more than this. Fortified oil contains approximately 3,000 units of vitamin A and 400 units of vitamin D. In computing the need of any flock of chickens, however, it is necessary to take into consideration the amount of vitamin A which is contained in the various feedstuffs, such as alfalfa and yellow corn.

While the amount of vitamin A required for other classes of live stock has not been computed as accurately, we recognize that in all classes of live stock it is essential that there be approximately 55 I. U. of this substance per kilogram of live weight. This fact has been brought out forcibly in so-called cottonseed-meal poisoning in cattle. It was thought for many years that there is some toxic substance in cottonseed meal. However, it was found that the trouble is caused by a low vitamin A intake under feeding conditions in which cottonseed meal is used extensively, and that it can be corrected by the use in the ration of 20 per cent of soy bean hay which has been properly cured. Soy bean hay is a good source of carotene, the precursor of vitamin A.

It was recently demonstrated at the Ohio experiment station that one of the major functions of colostrum is to furnish to the new-born calf a high intake of vitamin A. If the vitamin A in the colostrum is destroyed chemically, the calf becomes stunted and blind and eventually dies. This can be prevented by using vitamin A concentrates or by feeding finely cured, leafy alfalfa. As a matter of fact, vitamin A deficiency in cattle is probably much more prevalent than we believe. An acute vitamin A deficiency in cattle was not brought to the attention of the profession as a whole until enormous losses occurred in the intermountain and western states following the severe drouths of 1934-1935, when the hay that was harvested to be fed the following winter was of low carotene content. As a result, there were enormous losses the following winter and spring. The condition was finally diagnosed as an acute vitamin A deficiency, resulting in spontaneous abortions, lung degeneration and generalized respiratory infections. I have

since had an opportunity to see this same condition on numerous occasions during the past winter (1938) on the Eastern Seaboard.

If one attempts to supply vitamin A to dairy cattle in the form of the ordinary commercial cod liver oil, digestive disturbances are apt to occur and there may be a reduction in fat production, and possibly off-flavored milk. This will not occur, however, if fortified oils of high unitage are used, or if commercial carotene is employed.

Vitamin A is destroyed easily in the average ration. Improper curing of hay is one of the chief factors contributing to the destruction of the A content. Therefore, in all commercial feeds, the A unitage is much higher than the figures given herein and, if the veterinarian is called upon to advise as to the refortification of rations with A, the destructibility factor must be taken into consideration and the unitage raised to allow for it.

Vitamin B.—The vitamin B complex, or the B-G complex, as it is sometimes known, is an important group. Under this group comes first, vitamin B₁, or the anti-polyneuritic factor. From the standpoint of animal nutrition, and particularly from the veterinarian's standpoint, there has been a recent contribution by Dr. Patton of Michigan on the use of B₁ in dog feeding, in connection with running fits. This is a significant finding that will help to solve many of the problems confronting small animal practitioners. B₁ is also known to play a rather important part in certain types of paralysis in poultry. This work is purely in the experimental stage and no definite recommendations can be made as to its possibilities. Fortunately, this factor in ruminants and other classes of live stock does not seem to be important at this time, as apparently enough of the material is supplied in the average ration.

Also in the B classification is nicotinic acid, which is essential in the control and cure of pellagra in humans and blacktongue in dogs. Probably the most widely used of the B-G complex is the vitamin known as B₂, or G, more commonly referred to as riboflavin. Through the work of the Ohio

and Cornell stations, this factor has been established as the agent responsible for proper growth and proper hatchability in chickens. The requirements of vitamin G for poultry have been rather thoroughly worked out. For example, in baby chicks, 325 units per 100 Gm. (3.3 oz.) of feed consumed is required for normal growth. In older birds used for breeding purposes, 230 units of G are required per 100 Gm. of feed consumed. Turkeys require approximately 25 per cent more vitamin G than chickens. This is one of the factors which is abundant in buttermilk, dried skimmed milk, dried whey, soy beans and yeast. There are also certain commercial products which are good sources of this substance.

Vitamin C.—From a practical standpoint in livestock nutrition, vitamin C is not particularly important. However, in evaluating a ration for dairy cattle, one should consider the vitamin C content of that ration. The flavor of milk is greatly influenced, if not controlled, by the inclusion of a proper level of vitamin C in the ration. In this connection, citrus pulp, which is prepared commercially in the South for dairy feeding, is a good source of vitamin C.

Vitamin D.—Vitamin D is the best-known and most widely utilized vitamin. The fact that sunlight is the best source of vitamin D has led many feeders to believe that vitamin D supplements are not needed. This has been unfortunate in many circumstances because they have failed to take into consideration that under present methods of management of both poultry and dairy cattle, there is a tendency to house and maintain these animals under artificial conditions. When this is done, some provision must be made for the vitamin D intake.

Vitamin D has long been recognized as an almost essential component of poultry rations. Due to the rapid growth of the poultry industry and the heavy egg production, there must be a high intake of vitamin D in order to allow for the extensive use of calcium by the hen's body. Chicks require 354,000 units of this vitamin per ton of feed consumed, and laying hens

require 1,500,000 units per ton of feed consumed. In housed birds it is merely a problem of mathematics to determine what has to be added. The most available source of vitamin D is some type of marine oil, either natural or fortified, or an irradiated product.

In the production of commercial poultry feeds, ample provision is made for supplying vitamin D, and cases of rickets are rare in birds given commercial feeds. In farmed flocks, however, rickets occurs to some extent.

The importance of vitamin D in poultry feeding has been recognized for a long time but only in recent years has it become established in dairy production. It is now known that dairy calves, kept many months of the year in barns, must be provided with additional vitamin D. The average dairy calf requires 300 units per day, and will develop rickets if given only 100 units per day. In the intermediate unitages there will be a distinct interference in the normal growth and skeletal development. Proportionately, this is true in dairy cows and many of them fed on a poor-quality roughage must be given additional vitamin D. This should be provided in a concentrate, however, because the feeding of cod liver oil over a long period of time to dairy cows may influence milk flavor and even prove toxic.

Fortunately, vitamin D is stable and once it is provided for in a ration under average conditions, it should continue to provide ample protection. Storage tests on vitamin D contents of feeds have shown complete stability after 32 weeks of storage.

Vitamin E.—Vitamin E has recently been synthesized as alphetocopherol. The most potent natural source is wheat germ oil. Vitamin E is contained in varying amounts in certain leafy plants and in some vegetable oils but, unfortunately, in the oils contained in so-called protein concentrates, such as cottonseed, linseed and soy bean meals, there is no vitamin E. This vitamin has been definitely established as the reproductive vitamin. Without it reproduction can not take place. Depending upon whether there is no vitamin E or an

optimum amount of it, there are all gradations of reproductive disorders, such as failure to conceive, noninfectious or nutritional abortion, weak and nonviable offspring, and inability to breed due to nutritional deficiencies that are carried into the offspring.

It would seem that one of the more important things to consider at this time, especially from a professional standpoint, is whether or not, in the average ration as it is compounded today, either on the farm or commercially, there is sufficient vitamin E. Many investigators are of the opinion that there is sufficient vitamin E in the average ration, but by the same token there is considerable disagreement as to the adequacy of this factor. Where vitamin E intake has been increased, there has been a marked improvement in the breeding performance, especially in dairy cattle, and as a result of this improvement in performance, some producers of commercial feeds are refortifying their dairy rations with wheat germ oil, in exactly the same manner as they fortify poultry rations with cod liver oil. In certain cases, poultry rations also should be fortified with vitamin E. Unfortunately, however, the amounts that are practical to include in a feed are only sufficient for maintenance and are not sufficient to correct a vitamin E deficiency. There is considerable evidence to support the thought that vitamin E in ample amount in a ration provides the same type of protection to infection in the reproductive system that vitamin A provides in the respiratory system.

FATTY ACIDS

There is one other factor that should be considered in any dietary procedure, and that is the proper use of some of the so-called fatty acids, particularly linoleic and linolenic. These have at times been improperly designated as vitamin F, which is not in accordance with the designation provided by the American Society of Biological Chemists. The fatty acids play a distinct part in animal nutrition, and they appear to be responsible for proper conditioning, hair coat and finish. They are provided by cer-

Cattle Practice*

By E. R. CUSHING, D.V.M.

Plainfield, N. J.

NEW JERSEY is a cattle-purchasing state, importing from other sections of the country about 25,000 head of cattle a year—principally dairy cattle, but in the past few years there have been purchased quite a number of beef cattle for feeders. A large number of these animals are bought as "springers," or those about to freshen, and are sold for slaughter at the end of one lactation period. This procedure is practiced by many of the large commercial dairies. Some of the farmers who depend upon the wholesale market for their outlet do some breeding, but not to the same extent as in the Midwest or South.

"HEMORRHAGIC SEPTICEMIA"

This large traffic in cattle predisposes several veterinary problems, chief among which, at this time of the year (November), is the disease the cattle dealers call "shipping fever" and we, as veterinarians, term "hemorrhagic septicemia." Some of us are not certain that we are using the correct terminology, but for lack of a better term we continue to identify the disease by this name. It has been said that a diagnosis of hemorrhagic septicemia at anytime is evidence of the veterinarian's ignorance.

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(Continued from preceding page)

tain vegetable oils, notably linseed. It is probably because these substances are contained in linseed that it is and has been for many years the substance used in providing the finish and bloom required on certain classes of cattle. There are some animal fats that also contain these essential substances. In the diets of dogs and all classes of live stock, fatty acids should be taken into consideration when compounding or judging any ration.

I am inclined to doubt that this disease is the same as that described by European writers as hemorrhagic septicemia. Hutyra and Marek describe it as occurring chiefly in the summer, in contrast to Udall's statement that this disease occurs chiefly in the late fall and winter. My experience has been that this disease occurs in stabled animals chiefly in the cooler months of the year, rarely in the summer. Changeable and stormy weather seem to predispose the occurrence of the condition. A number of other differences in the European disease also are noted. I personally believe that at times, at least, we are dealing with a mixed infection rather than a condition entirely attributable to the *Pasteurella* group of organisms. As we generally see it in shipped cattle, this disease does not always assume the characteristics of the hemorrhagic septicemia we have seen to appear sporadically on farms in New York State where no new cattle have been introduced. Inasmuch as I am not a bacteriologist, I base my idea entirely upon clinical findings and the action of certain biological products, not upon bacteriological findings.

Cattle that are brought from the Midwest in express cars, without being unloaded at any stockyards, are much less liable to contract the disease than those which have been unloaded for the required eight-hour rest. We see such cases of the disease at the time of unloading or, usually, within three days of this time, although I have seen the disease appear after a longer interval. Hutyra and Marek give the incubation period of hemorrhagic septicemia as possibly as long as two days, while Udall states that the period of incubation is not more than ten days. The condition which we encounter may appear even a week or more after unloading. I am confident, however, that fatigue from shipment and adverse weather conditions are factors which shorten the incubation

period. Whether those which show symptoms after the longer period have contracted the disease from the original exposure in transit or from later contact with those early cases, I can not say definitely, but I am inclined to believe that both factors have an important bearing. I do know that at times the outbreak is brought under control much more readily if the sick animals are isolated rather than allowed to remain with the apparently well ones, even if they have all been shipped together.

I have observed instances where recently shipped cattle have been introduced into private herds and, within one week, several cows in that herd would be sick, without any evidence of the disease in the newly introduced cattle. I vividly recall one herd of about twelve or 14 animals in which three new cows were introduced and distributed in stanchions among the other cattle. In less than ten days four of the original herd were dead, but the new cows had not missed a meal and did not at any later time show any symptoms. It is not uncommon to find that some farmer has purchased a new cow and placed her directly in his herd. After two to five days the new addition is sick (perhaps she already was carrying a temperature when delivered); and after two days to a week more, several or all of the original herd are sick.

Symptoms.—We often see a whole carload of cattle with some cough, but only part of them develop other symptoms. Usually, the first symptoms we find are coughing and rise of temperature, with or without variable degrees of diarrhea. For a few hours the animals may not show other symptoms, but soon extreme depression, complete loss of appetite and increased respiration with temperatures ranging from 103° to 106° F. follow. Generally, pneumonia is not present the first day, but if the condition is not checked, it frequently, but not always, has developed by the second day. Sometimes the earliest symptom is severely labored breathing. Usually, these cases do not respond well to treatment and die rather soon. On

autopsy, there is extensive interstitial emphysema. In some years the predominating symptoms are respiratory, and in other years the general septicemic form is more prevalent, without any particular localization.

In cases where respiratory symptoms are most prevalent, the head is usually extended; sometimes there is mouth breathing and expiratory grunt. A nasal discharge may or may not be present.

Prognosis.—The course of the disease, as we see it, is quite variable. Sometimes death will come in two days, or within two days, even with active treatment, and other cases may drag along for a week or ten days, or occasionally as long as two weeks, and finally die. Usually, however, if a case lasts for a week, it eventually recovers. Parturition during the course of the disease reduces the chances of recovery at least 50 to 75 per cent. I do not mean to infer that all of the victims of this disease die, although in some years I have almost arrived at this conclusion, in spite of all methods of treatment. Perhaps those that do get well do so in spite of treatment, rather than because of treatment.

Treatment.—As to the treatment, there are about as many ideas concerning this as there are individual veterinarians handling the condition. I feel that treatment should vary according to a number of factors, not the least of which is the economic factor. If it is within one's control to prescribe preventive treatment before shipping, the battle is more than half won. I will speak of this later. Generally, though, we have little information as to what actually has been done to the cattle before arrival. The dealer may tell us that they were "injected" before shipment but, of course, that means nothing unless we know what was used, and usually he is unable to give this information.

If the owner is willing, I like to give these cows 150 to 200 cc. of hemorrhagic septicemia serum of bovine origin—one half intravenously and one half subcutaneously. I also give from 180 to 240 gr. of sulfanilamide, repeating this in six hours and again in twelve hours. The second and third days

I give the same dosage of sulfanilamide morning and night. Sometimes, because of the cost the owner refuses to allow the use of serum, in which case I give the sulfanilamide with other symptomatic treatment. Regarding the use of serum, the results seem to vary materially from year to year. In some years we seem to get excellent results from its use, and in other years it seems just a waste of time and money.

I have been apparently unable to secure results by treating with bacterins as a curative agent, although I do feel that they have a definite value in immunization. Those who do believe that they have results with bacterins as a curative show quite different opinions in choosing the kind of bacterin as well as the dosage. Some use the hemorrhagic septicemia bacterin and others use the pneumonia mixed bacterin (bovine). Some veterinarians use 5 cc. daily, some 10 cc. daily, and I know of men who claim that 40 to 60 cc. of bacterin daily must be given to get beneficial results. This they repeat for two to five days, or until the temperature approaches normal. I have always felt that bacterins injected into sick animals tend to keep the temperature elevated. My experience with the use of bacterins has led me to conclude that if an animal is in the incubative stage of the disease and 5 to 10 cc. of bacterin is administered, this generally seems to be all that is necessary to precipitate the disease in twelve to 24 hours. I am going to cite a little later an instance where the opposite is true, which is one of the problematical things to me and to others dealing with this disease.

A practitioner in New Jersey, in a discussion on this subject several years ago, reported splendid results from the use of hemorrhagic septicemia aggrassin as a curative agent. He injects 5 cc. subcutaneously every third day for two or three doses and claims that the number of recoveries induced by this treatment is larger than that secured by the use of serum—at much less expense. He supplements this with symptomatic medication.

Another method of treatment, introduced several years ago, which seems to give some results, is the intravenous injection of 1,500

to 2,000 cc. of 8 per cent sodium bicarbonate solution. Injection is made by gravity until the patient begins to get unsteady on the feet. This is administered only once. The unfavorable feature of this method is that it takes about half a day to inject ten or a dozen head.

One veterinarian whom I know believes that biological products are often without value in this disease. He treats his cases with 0.5 oz. of sulfanilamide three times a day. He generally applies a counter-irritant over the chest cavity and blankets the patient. He states emphatically that the reduction of drafts and stable moisture is an important factor in the care of such cases. Stable care is unquestionably important in treatment. Mortality rates are much lower in stables which allow the entrance of enough fresh air to prevent the collection of moisture on the walls and windows, without a draft. Sick animals should, of course, be blanketed when possible.

Preventive Measures.—In one certified dairy where I am employed, we have tried several methods of immunization prior to shipping, and the plan we use now is to give each cow 100 cc. of hemorrhagic septicemia serum (bovine) subcutaneously, immediately before shipment. Within a week after arrival, if the animal is not carrying a temperature, 5 cc. of pneumonia mixed infection bacterin (bovine) is given. If any cows are purchased from dealers, these are always given 100 cc. of the serum as soon as they are unloaded at the farm, and they are isolated for a week or ten days.

If serum alone is given at the time of shipment, and no further steps in immunization are taken at the point of destination, there is likely to be a fresh outbreak of the disease between three and four weeks after the injection of serum.

Another veterinarian with whom I am acquainted purchases most of the cattle for a large milk concern in the East. He has used many different methods of preventive treatment before shipping. His present method is to give 10 cc. of pneumonia mixed infection bacterin (bovine) or hemorrhagic septicemia bacterin (bovine), preferably the former, at the time of purchasing the ani-

mal. Three days before loading he gives another 10-cc. dose of bacterin. After the animals are in the car, he gives each animal 50 cc. of hemorrhagic septicemia serum (bovine) subcutaneously.

A shipper of cattle whom I know generally purchases his cattle through another party and he does not see the animals until they are assembled for shipment. He gives 5 cc. of hemorrhagic septicemia bacterin and 100 cc. of hemorrhagic septicemia serum (bovine) subcutaneously and ships at once. One day after unloading he injects 6 cc. of bacterin. If any cows are carrying temperatures 48 hours after the second injection of bacterin, they are given either additional serum or sulfanilamide along with expectorants.

In herds where new animals are purchased from time to time, I always try to persuade the owners to have their herds injected annually with bacterin or aggressin (bovine), in the fall. This precaution usually protects the herds from the disease, which might be brought in with new additions, even though these new additions are isolated. In smaller herds, however, facilities for isolation are generally lacking.

REPORTS OF CASES

Case 1.—Some years ago new additions were purchased by a large dairy where I was doing the daily work. The new cattle were isolated from the balance of the herd and all persons who had contact with the herd were excluded from the isolation quarters. The rule was adhered to strictly by everyone except the farm superintendent, and I was not aware that he was violating it. He used to visit the new cattle every day and, without any precautions upon leaving their quarters, go to any other part of the plant that his duties might call him. Several of the new cattle became sick, and after five or six days one of the cows in the main herd also became sick. At that time it was not their policy to immunize the herd annually, but after the disease appeared in the herd, we decided to inject all of the cattle with 5 cc. of bacterin. In spite of this, in the barn where the first cow took sick we continued to find one or two

additional sick cows each day for nearly a week, when we decided to give 100 cc. of serum to each animal in the barn. After this was done, no more cattle became affected and the disease was soon under control. One animal died in this outbreak.

Case 2.—From a herd of eight or ten animals, all but one of which had been raised on the farm, the owner took a cow to a neighbor's bull. The neighbor bought and sold cattle on a rather large scale. After about four or five days, five cattle, including the recently bred animal, showed symptoms of what we term hemorrhagic septicemia. I had allowed my stock of serum to get low and I had on hand only 300 or 400 cc. I gave this to the sick animals and ordered more serum. For some reason the new lot of serum was not sent. I telephoned a colleague in a neighboring town and he told me that he had 250 cc. on hand that I could borrow, which I did.

The borrowed serum was not made by the concern that I patronize, but it was purchased from a reputable concern, and the labeling called for its use on all species of animals. The source of this serum was not stated on the outside of the package, but I later found that it did appear in fine print on the circular enclosed with it. I always had used nothing but bovine serum and assumed that this was also of bovine origin. I gave 50 cc. intravenously to each of the five sick cows, and before I left the last cow, she began to quiver and became weak in the legs. She dropped down and died instantly.

The owner said that the medicine was too strong, but I explained that the fact that the first four cows were showing no ill effects precluded that as a causative factor. Then he decided that her heart had not been able to tolerate the medicine, and to this I heartily agreed. I knew that it was a case of anaphylaxis. The cow had been purchased from a dealer a year previously. She probably had been given hemorrhagic septicemia aggressin of equine origin as an immunizing agent at that time. When I gave her equine serum intravenously, "her heart couldn't stand it." I have cited this

case to stress the necessity of knowing the origin of the serum which is administered.

Case 3.—I was called in October 1938 to administer a tuberculin test to 50 Hereford steers just off the range in the West. They had been brought into New Jersey by special permit to be held under quarantine until after testing. They were confined in two pens in a large shed, open only on the south. I noticed that a great many of these steers were coughing, but only two of them seemed particularly languid and off feed. When we injected and tagged these two, I took their temperatures and found both to be very high. These animals showed definite symptoms of the disease we term hemorrhagic septicemia.

The next day several more showed some of the same symptoms and one of the two original sick ones was dead. We gave hemorrhagic septicemia serum to all that showed any symptoms of sickness and isolated them as best we could with the facilities available. It did not take long to find out that it was not practical to try to give these steers any medication by the mouth.

I did not give bacterin to those not already sick, which perhaps I should have done in this case, but there had been some bad after effects in cases I had treated previously with bacterin, and I was afraid to take the risk. No more steers died in this outbreak and the disease was well under control in about two weeks, although all of the animals continued to cough for weeks afterward.

Just two months after the initial outbreak, when the weather was cold and blustry, I was again called to see these animals. They were showing the same symptoms as before. Some of the same animals were sick again, as well as others which had not previously been affected. Soon after the first sickness, another lot of 25 native steers were brought to the farm, but they were given hemorrhagic septicemia aggressin at the time they were introduced. These had been kept away from the first lot, but in an adjoining, new feeding shed, and after the first week the same attendant cared for both lots. In this second outbreak, one of the steers in the native lot also was af-

feeted with identical symptoms. My diagnosis was the same as it was two months previously, and all of the sick animals were given hemorrhagic septicemia serum—from 100 cc. to 250 cc., according to their temperatures. The lower half of the open south side of the shed had already been boarded up and we tacked burlap bags over the open upper part, thus cutting off direct wind.

I called in a colleague for consultation, and at his suggestion we gave 5 cc. of pneumonia mixed bacterin to those not already showing symptoms. Three of those already sick, died, but no new cases developed. Whether the animals stayed well in spite of the bacterin, or whether the bacterin was responsible for checking the outbreak, I am unable to say.

RETAINED PLACENTA

If a cow that calved at full term has a retained placenta, I prefer not to remove it for 48 to 72 hours after the delivery of the calf, unless the animal is off feed or is showing signs of a septicemia from uterine absorption. Some men do not remove the placenta, but introduce a pint of liquid petrolatum to which has been added iodoform and bismuth or bismuth-formic-iodide and with a rubber catheter try to get it between the placenta and the uterine wall. This is allowed to remain until the placenta comes away or disintegrates. I do not care for this method, although there may be some features about it that are commendable. My experience, in trying it a few times, has been that the odor from the animal, particularly in warm weather, is generally so disagreeable before the placenta drops that it is impossible to keep her in the barn with the other cattle. Some of these cases develop a septicemia from absorption before the placenta drops and it has to be removed to reduce the source of infection. Then, too, with this method of handling retained placenta, it is impossible to keep the animal clean.

I prefer to remove the placental membranes manually at the time previously stated, especially if this can be done without causing severe damage to the cotyledons. If the attachment is so firm that it causes

tearing, hemorrhage or severe damage to the maternal cotyledons, I introduce capsules between the placenta and the uterine wall and wait for one or two days before again trying to remove it. Once it is removed, I cup out with my hands as much of the uterine débris as possible and leave capsules in each horn. Some men mop out this débris with wads or swabs of cotton. In these cases I also use a general stimulant by the mouth, such as 1 gr. of strychnine sulfate three times a day. There are many good uterine capsules on the market, but the one I have used for years consists of boric acid, bismuth-formic-iodide power and bismuth subgallate. This may be purchased already prepared from a supply house or one may make it up himself, as follows: One lb. each of boric acid and B.F.I. powder and 10.5 oz. of bismuth subgallate (the Axby formula); place as much as possible in a No. 10 capsule. I usually use three or four of these capsules at a time.

Years ago it was considered good practice to douche these cases with hot normal saline solution immediately after removing the membranes, and then to siphon off as much as possible. I practiced this procedure for a long time but now feel that by treating cases as outlined they will clear up much faster than by introducing any aqueous solution into the uninvoluted uterus. It is almost impossible to siphon off all of the liquid that is put in, no matter how careful one is, and the fluid left in makes just that much more to be absorbed or forced out by uterine contraction. Frequently the uterine walls are atonic and, with this additional medium for infection present, the uterus is kept drawn forward over the brim of the pelvis—an inert bag. This delays the processes of involution.

I frequently give 3 or 4 cc. of pituitary extract to the animal as soon as I have removed the membranes, and I am convinced that a daily dose of the same amount for a few days is a profitable procedure. There has been some question as to just what action, if any, posterior pituitary extract has on the nonpregnant uterus. I have used it in this connection for a number of years and I am convinced that it has a definite action to promote contraction

of the uterine wall, while in the process of involution. Unless the owner definitely refuses to allow it, I always make a return call on these cases in four to six days and remove as much of the débris as possible by massaging the uterus per rectum. This will hasten materially the return to normal of the entire organ. If there is evidence of absorption to the extent that septicemia is present, I use 1.5 gr. of acriflavin, injected intravenously in 100 cc. of water. Metaphen intravenously or phe-mer-nite also may be used.

There is a product recently placed on the market which may prove of aid in removing firmly attached fetal membranes. It comes in tablet form and, upon contact with the uterine secretions, it forms a foam, as peroxide of hydrogen does. Several of these tablets are placed in the uterus between the wall and the placenta and allowed to dissolve. After one-half hour, effort at removal is again made. I have not used them in this connection, but I have used them in cases of severe metritis with much putrefaction, and secured good results. I have not, however, used enough of them as yet to arrive at any definite conclusion concerning their efficiency.

If a cow that has had retained placenta is to be bred again, I think that her chances of conception and of having a normal calf are much improved if she receives a uterine douche of 0.5 to 1 per cent of hot Lugol's solution on the day of first estrum after calving, or on the following day. Of course, she should not be bred at this time. If cervicitis is present, I prefer to swab the cervix with pure Lugol's solution.

If chronic metritis is present, I douche the uterus with hot normal saline solution until the return flow is clear and then introduce from 1 to 2 oz. of pure Lugol's solution. I then massage the uterus per rectum and allow the solution to drain out through the cervix.

FOOT ROT

Another perplexing disease encountered in large animal practice is foot necrosis, or so-called foot rot in cattle. We see this affection in pastured cattle in the extreme seasons—either very dry or very rainy. In

the dry seasons the cattle will congregate in any available mud hole and stand there in the heat of the day, with the result that their feet become infected. In the rainy season, every place is muddy and the animals can not escape infection. A common place where this miserable infection is acquired is in the mud immediately around a water trough, or where the overflow from a trough goes down through the lot. The owner may deny that there are mud holes to which his cattle have access, but if one will go out to look for them, he can find them without difficulty. Once the condition occurs on a farm, it will reoccur every year unless the mud holes are drained and limed, or even fenced and the cattle kept away from them.

As a prophylactic measure, I place a lime box in front of the stable door. This consists of a shallow box, with 2 x 4's for the sides, large enough so that the cattle coming in and out of the barn will have to walk through it instead of jumping over it. This should be filled with slaked lime and stirred with a fork twice a day so that it does not become packed down.

Regarding the actual treatment of cases, I do not have any routine method. If there is a visible lesion on the bottom of the foot or between the claws, I try to cut away all of the diseased or underrun tissue. Sometimes I paint the whole area with a 15 or 20 per cent solution of nitrate of silver and apply a wet pack of saturated solution of iron sulfate or alcoholic solution of bichloride of mercury 1:500 and bandage. The bandage should be changed after 48 hours. In some cases a pack soaked in vinegar is helpful in controlling the infection. If the infection is chiefly between the claws and not in the hoof itself, I sometimes soak the foot in hot creolin solution, especially if the infection is diffuse above the hoof. This is often helpful in localizing the infection or, as it is sometimes expressed, "drawing it to a head." After the lesion is open, I treat it as stated above. I always feel that a case is progressing satisfactorily if I can dissect out a necrotic mass or "core." Usually, after this comes out the condition soon heals. At this stage I frequently

change to a dry surgical powder, but continue to bandage.

In cases where the infection seems to be primarily in the tissue above the foot, it is almost impossible to localize it downward. It may involve the articulations or follow up the tendons and even cause necrosis and rupture of a tendon. Where the articulations are involved, I sometimes anesthetize the patient and amputate the affected claw, cutting through the hoof just below the coronary band. This does not seem to cause the patient any permanent disability, as the hoof wall will grow down and cover the wound completely.

In herds where foot necrosis is a common ailment, one should always watch carefully for cases of necrobacillosis of the liver. These cases show symptoms very similar to traumatic gastritis with the addition of a high pulse and a high temperature (104° to 106°). Jaundice may or may not be present. In my hands these cases have not responded to treatment.

PARTURIENT PARESIS

My routine treatment for parturient paresis is to inject 250 cc. intravenously each of calcium gluconate solution (23 per cent) and 50 per cent dextrose solution. I also inject 3 to 5 cc. of posterior pituitary extract subcutaneously or intramuscularly. I believe that one can secure a better response to the treatment by stimulating contractions of the uterus. If apparent recovery from the condition does not come about within a reasonable length of time, I always make a careful examination of the uterus and ascertain, if possible, whether or not I am dealing with a septic metritis. If this is present, the chance of recovery is greatly reduced. I give more posterior pituitary extract and try to empty any accumulated debris from the uterus, either manually, by siphon, or by massage, or by combining two or all three of these methods.

In every case of parturient paresis or condition showing similar symptoms, I make a return call in four to eight hours, at which time I carefully check the digestive tract. Frequently, the digestive stasis which has occurred during the height of

Canine Nephritis*

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THE KIDNEYS consist of several millions of units, each of which is a complete kidney in itself. These units of structure are known as nephrons.

The nephron is made up of glomeruli and tubules. The glomerulus is formed through the invagination of a growing kidney tubule by a tuft of capillaries. The invaginated part is lined by a flat epithelial layer which is reflected on the capillaries. It is continuous with a tubule which is coiled and twisted, lined with a higher epithelium and known as the proximal convoluted tubule. The tubule is then reduced in diameter, lined by a low epithelium, dips down into the medulla, curves sharply on itself and passes back up into the cortex. This part is known as the tubes and loop of Henle. In the cortex its diameter is greatly increased, it is again coiled and twisted and its epithelial lining becomes higher. This part is known as the distal convoluted tubule. It is finally continued by the collecting tubules, many of which

unite to former larger tubules, these finally emptying into the pelvis. The capillaries which form the tuft unite to form an arteriole which passes out of the glomerulus and supplies the tubules of that particular unit. This then constitutes the nephron, a structure which performs every function of the entire organ.

The framework of the kidney is composed of connective tissue, commonly referred to as interstitial tissue; hence the term "interstitial nephritis" to describe extensive damage in this part of the organ.

The nerve supply of the kidney is unique in that the nerves go only to the blood vessels. This has led to the suggestion that renal neurectomy might be a successful way to treat uremia. Actual renal neurectomy has been resorted to in alleviating and, in some cases, actually remedying certain types of hypertension and pyelonephritis. It immediately produces an increase in the renal blood supply and the production of urine and a lowering of the blood pressure.

The function of the kidney is to assist in maintaining the acid-base balance of the body and to remove waste products by way of the urine. To illustrate the first-mentioned function, we select one of the acids and one of the bases from the many that are found in the blood. When the ratio of carbonic acid to sodium bicarbonate is approximately 1 to 20, the pH of the blood is plus or minus 7.4. This is one of the body constants and is subject to but little variation when conditions are normal. If the acid increases and upsets the balance, the lungs attempt to lower the acid content by deeper respirations. If this is not sufficient, the kidneys form ammonia from urea. Ammonia, being a base, combines with acids to form salts, which are then eliminated by way of the urine. The kidney is capable of eliminating some acids as such, *i. e.*, uric, hippuric, oxybutyric, acetoacetic, acetone, etc. Finally, it may com-

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(Continued from preceding page)

the disease is slow in being rectified and a saline purge must be given.

ACETONEMIA

In cases that show meningitis and intense excitement, I often suspect lead poisoning, particularly if more than one animal is affected.

We have all seen cases of acetonemia that persist and neither get well nor die. One of my colleagues has suggested that after these prolonged cases have been given injections of glucose, perhaps some of these symptoms are due to too much sugar. He has treated one or two of them with intravenous injections of magnesium sulfate, 80 to 100 cc., with good results.

bine an alkaline phosphate with carbonic acid to form acid sodium phosphate, which is excreted in the urine, and sodium bicarbonate, which remains in the blood ($\text{Na}_2\text{HPO}_4 + \text{H}_2\text{CO}_3 \rightarrow \text{NaH}_2\text{PO}_4 + \text{NaHCO}_3$).

The kidney produces urine from the blood by a combination of processes, namely, filtration, absorption and secretion.

Filtration occurs in the glomeruli through Bowman's membrane. Under normal conditions the filtrate contains the same concentration of glucose, sodium chloride, urea, etc., as the blood plasma from which it is derived. It does not normally contain any of the blood proteins, for it seems they are not able to negotiate an intact Bowman's capsule. If there is damage to this capsule, then albuminuria can originate here, but it also can originate in other parts of the urinary system. Obviously, the filtrate is much more concentrated as far as these substances are concerned than it is when it finally becomes urine, reabsorption being responsible for the reduction of such threshold substances as glucose and sodium chloride, and some of the waste products as well as water. This process takes place principally in the thinner parts of the tubules. If there is damage to these tubules, greater than normal quantities of some of the urinary constituents are absorbed, and we say that there is an inability of the kidney to properly concentrate the urine. These constituents remain in larger amounts in the blood than is usually the case and are responsible for some phases of the so-called uremic syndrome. This type of kidney failure can be measured by determining chemically the increase in the blood of these absorbed substances.

Secretion takes place in the convoluted tubules. Here, organic compounds, coloring matter, ammonia, hippuric acid, etc., are secreted in the urine. Injury to these parts interferes with this function. The extent of injury can be measured in some degree by introducing into the blood stream certain dyes and then determining how quickly and completely they are secreted in the urine.

It seems that the entire kidney is not always producing urine. It has been esti-

mated that only a small part of the organ is at work at any one time, the larger part being in a state of rest. This explains why one half or even more of the kidney may fail to function before any evidence of kidney failure can be found. Judged by ordinary standards, when failure is detected, the condition is already serious. This is, perhaps, one reason why therapy in this organ is not as satisfactory as it is in other diseased organs.

Almost any serious disease may interfere with kidney function and thus bring about a secondary nephritis. This is especially true when the primary disease is due to an infection. This is usually called acute diffuse nephritis. It may occur along with the primary disease or be apparent only after recovery from the former. In some cases of primary nephritis, pathogenic organisms can not be demonstrated. These are sometimes referred to as metabolic nephrites. In other cases streptococci, staphylococci, the colon group, *Leptospirae* and other organisms play an important rôle. Focal infections often are encountered in the teeth and gums of middle-age and elderly nephritics. Poisons, such as arsenic, mercury, turpentine, lead and phenol, may be responsible in some cases.

For centuries nephritis has occupied a prominent place in human medicine. Veterinary pathologists have always called attention to the frequency of kidney lesions encountered in dogs at autopsy. Contrast this with the infrequency with which we detect kidney involvement and it becomes evident that we must be overlooking many cases. Perhaps we should not be taken too severely to task, for many patients are seen which exhibit symptoms that do not in the remotest way implicate the kidneys. However, this does not excuse any of us for not attempting to improve our diagnostic ability in this direction.

In man glomerulo-nephritis is the type of renal disease observed most frequently. Some veterinary pathologists believe that in the dog, interstitial nephritis is the most important inflammatory renal disease and that glomerulo-nephritis is not often seen.

Pathologically, interstitial nephritis is

characterized by inflammatory changes in the interstitial tissue with the formation of connective tissue, resulting in degeneration, atrophy and even disappearance of the kidney tubules. In other words, the dominant feature is tubular damage, with uremia the essential symptom complex.

UREMIA

Many theories have been proposed as to the cause of uremia. At present it is conceded to be due to the retention of urinary constituents, none of which has yet been incriminated. The name originated from "urea," which is always present in the blood in abnormally large amounts in interstitial nephritis. Uremia does occur in other forms of nephritis but it is not as pronounced as in the interstitial type and it does not develop as quickly. However, since urea is not particularly toxic and can be injected into the blood in amounts many times greater than that found in uremia without causing damage, it must not be the cause.

Urea.—Urea was discovered in urine by Rouelle in 1773 and produced synthetically by Wöhler in 1823. It was the first chemical to be produced synthetically, and this event may be regarded as the birth of synthetic and biological chemistry. Chemically it is CON_2H_4 , with the N_2 making up 46.6 per cent of the total. In nearly all blood determinations the results are expressed in terms of nitrogen; hence the frequent reference to urea nitrogen.

It is found in practically all plants and animals, at least wherever protein is utilized, since it is an end product of protein metabolism. In the animal body the nitrogen of the proteins is a waste product and urea is the form in which most of this nitrogen is eliminated. We know that it is formed in the liver, since the removal of the liver stops its production. It is found in all body fluids, but chiefly in the blood and urine. In the blood of normal dogs it is present in from 10 to 20 mg. per 100 cc., and normal kidneys maintain it at these levels. In interstitial nephritis it goes above these figures, the increase being directly in proportion to the severity of the disease. Blood urea is one of a group of

substances known as the NPN, or non-protein nitrogens. This group includes uric acid, creatinine, creatine, amino acids and ammonia, with the urea nitrogen making up about one half of the total. Of this group the urea shows the most consistent increase with the development of uremia. For this reason it is the constituent usually investigated if blood determinations are made. It is a useful clinical yardstick.

Increased blood urea does not always indicate kidney damage. It may be found in many toxemias, such as intestinal obstruction, shock, pneumonias, prostatitis, cardiac failure, severe infections and urinary retention. In these so-called nonrenal uremias the increase is not as marked as in the renal form, and kidney symptoms are not pronounced.

In addition to the retention in the blood of the non-protein nitrogens, there are alterations in the hemoglobin, glucose, protein, chloride, phosphate and calcium content, along with disturbances in the acid-base balance toward the acid side. All of these, or combinations of them, are partly responsible for some of the symptoms shown by the nephritic or uremic victim.

SYMPTOMS

The gross symptoms in many instances are vague. In mild cases there are often no appreciable symptoms, yet the patient is not quite normal. The history indicates a capricious appetite and some listlessness.

Often a dog is brought in which is visibly sick. The temperature is low normal, the pulse is a little fast, there is no change in the respirations, the mucous membranes are somewhat muddy and a slight odor emanates from the mouth. There is no nasal discharge. If placed on the floor the animal shows little inclination to investigate its surroundings. Not a single informative symptom is evident. The owner states that the dog has been sick several days and that it has eaten practically nothing. He can offer no information as to the bowel movements and does not know if the animal has been urinating frequently or even at all. If this patient should show an elevated temperature, which some do early in an attack, and is young, we would suspect distemper exposure.

Then, another patient is presented. It is middle aged and gravely ill. The history indicates illness for a week, anorexia, frequent vomiting, marked thirst, and diarrhea. The owner suspects that the dog has been poisoned. The temperature is subnormal, the pulse fast, and the heart beat can be felt easily on the chest wall. There is a foul odor from the mouth and an ulcer in the mucosae is seen just back of the last upper molar. The conjunctiva is congested and the blood vessels running back from the cornea are engorged with blood. The anal region is soiled and the skin of the neck stands up in the form of a thick fold for several minutes after being grasped by the fingers. Certainly, none of these symptoms implicates the kidneys.

If these patients are kept for observation, little else can be ascertained that is helpful. They may drink no water at all, or they may consume large quantities and eject it shortly thereafter. Food is refused entirely. Constipation or diarrhea may be present. They lie about, seldom getting on their feet and rarely changing their position. They pay little attention to other patients, strangers or even their owners. They move only when they have to vomit; then they go over to the corner of the kennel. Getting up and down seems to cause considerable discomfort in some patients.

In very advanced cases in which uremia is marked, the breath has the odor of urine. This, of course, would give a clue as to a diagnosis, but we can not wait for this to develop. In other cases mouth lesions are sometimes seen that resemble those in black-tongue.

A number of affections present similar symptoms, for example, gastritis, gastroenteritis, foreign bodies in the stomach, intestinal obstruction, intestinal parasites, black-tongue, peritonitis, leptospirosis, metritis and poisoning.

DIAGNOSIS

Symptoms similar to those mentioned should arouse suspicions, but to add authority to the diagnosis, we should cast a critical eye toward the urine and perhaps the blood. By all means, urinalysis should be

resorted to. If a microscope and a centrifuge are available (the latter is not absolutely essential), anyone can become quite proficient with a little practice. If a text on laboratory diagnosis is available, much useful information can be secured therein. The veterinary journals—and this includes the house organs—have published a number of good articles on the subject during the past five years.

Of the many changes taking place in the blood and urine of the nephritic or uremic patient, we are concerned primarily with those that may give clues as to diagnosis, prognosis and treatment.

Urinalysis.—The specimen will usually have to be obtained by catheterization. In the bitch a speculum and a curved metal catheter are needed. Placing the animal on its back makes it easier to find the urethral opening. In the male several sizes of web, olivary-pointed catheters are necessary. The human type will serve except in the largest dogs. The supply houses list special sizes for these. In both sexes a certain amount of contamination with pus cells from the sheath and vagina may be expected. Judged by standards used in human practice, the urine of almost every dog would show pyuria if this fact were not taken into account. To minimize this contamination, discard the first urine from the catheter and also the last that flows out as the catheter is withdrawn.

Since it now appears that leptospirosis is probably the most recent disease to be added to the long list of occupational diseases to which the veterinarian is subject, it is advisable to prevent skin contact with all urines from nephritic patients.

As dog urine is often concentrated, the specific gravity may run high, that is, up to 1.040 to 1.060. Specific gravity may not seem important but it is a measure of one kidney function, in that it gives one an idea of the amounts of solids in solution in the urine. If it is low, the kidney is failing to concentrate the urine. This is seen often in the chronic forms of nephritis and means that a large amount of fluids is required to remove a small amount of soluble wastes.

Normal urine in the dog is acid, but diet

and disease may influence this considerably. A high meat diet usually causes it to be acid, a high vegetable diet, alkaline. Alkaline urine should always arouse suspicion of cystitis or calculi. Determining the reaction plays an important rôle in the treatment of some cases, especially those in which infection has a part. The use of litmus paper is the usual method, but this is only reasonably accurate, because some urine may give one reaction and actually be the other. A more practical method would be one that reveals how acid or alkaline the specimen is. In so-called ketogenic therapy this is essential for successful treatment. A number of reagents are available for this purpose, either in the form of liquids or impregnated paper strips. One called nitrazene is very satisfactory. This consists of strips of paper impregnated with a dye which gives a play of colors from a light tan at pH 4 to a deep blue at pH 7.5 when a small drop of urine is placed on the paper. Comparison with a color chart gives the reaction.

There are many tests for albumin, but the heat and acetic acid test is probably used most commonly. Many are available that do not require heat. A few drops of a 20 per cent solution of sulfosalicylic acid when added to the specimen gives immediate results that vary from a slight opaque coloration to a heavy white precipitate. The amount found varies greatly; severe nephritis often is found when only traces are seen. Too much stress should not be placed on the albumin content as it does not prove nephritis. It may occur when pathological processes are not present, or it may be found when hemorrhage or inflammation occurs in any part of the urinary tract, or in passive renal congestion, after heavy consumption of proteins, in fright or violent exertion. Generally speaking, if it is present in large amounts, suspect glomerular damage; if in small amounts, suspect tubular damage. In male dogs the act of catheterization may cause the ejaculation of some semen and this may give a positive test for albumin. Other tests for other substances may be made, but only the above are essential.

The most important part of the urinary examination is the investigation of the sediment. In fact, a diagnosis with any degree of certainty can not be made without it. To carry out this procedure some of the specimen must be allowed to stand several hours in a conical tube or be centrifuged for three to five minutes at high speed, the supernatant urine poured off and the last few drops in the bottom of the tube mixed by shaking. A drop or two is then placed on a slide and examined by low power and then by high power to better identify some of the structures.

There are two general types of sediment: Organized and unorganized. The organized consists of casts, cylindroids, epithelial cells, pus cells, red blood cells, spermatozoa and microorganisms. Parasitic ova may occasionally be seen. The unorganized sediment is made up of the chemicals in urine in crystalline form. There are about a dozen of these but they will not be discussed here.

Casts may be present when the kidneys are normal but in the majority of cases point to a nephritis. Their presence is considered to be of much diagnostic importance. As the name indicates, they are cylindrical molds of the kidney tubules, just as an intestinal impaction is a mold of that part of the intestine in which it is confined. As urine accumulates behind them, they are finally dislodged and carried out. Some of the casts most commonly encountered will be described.

Hyaline casts are pale, transparent formations, varying in size and length. They are often difficult to see. They occur generally in the early stages of nephritis.

Epithelial casts are cylindrical masses of epithelial cells. The cells are usually round, but columnar cells may be seen. They are regular in outline but are not as long as hyaline casts. In acute conditions they are seen in large numbers.

Blood casts are masses of red blood cells. They are often rust colored and do not occur frequently in canine nephritis. They may be found in cystitis, especially when calculi are present.

Waxy casts have wavy, fluted contours,

are easily detected and have a yellowish color. They are seen only in chronic processes and indicate amyloid degeneration of the kidneys.

Granular casts are masses with distinct outlines. The ends are usually rounded, although they may be broken. They are straight or curved and quite often one end will taper off to a point. The granular material of which they are composed consists of albuminous debris from the disintegration of kidney epithelia, leucocytes and red blood cells. These granulations vary from fine to coarse, some having combinations of the two. Some may contain a few leucocytes or red blood cells, or even epithelial cells. Sometimes only a few will be found, but at times enormous numbers are seen, there being no constancy from day to day in this respect. In size they vary from very small to very large. Granular casts are characteristic of chronic states. If they are found when the illness is very recent or of short duration, the disease is probably an acute flare-up of a chronic state.

Epithelial cells found in urine are of three types: Squamous, cuboidal and columnar. The variations of these types that occur in the bladder, ureters, prostate and kidneys are such that only experts can determine, with any degree of certainty, where they originate. In acute nephritis, cells from the kidney tubules often occur in large numbers. They are small, round, nucleated and slightly larger than pus cells. Pus cells, in turn, are about the size of the nuclei of the large squamous cells of the bladder. A comparison of these cells is quite often helpful if all three can be found in a specimen. In any event, a large number of epithelial cells should lead one to suspect an acute condition, and the presence of hyaline casts at the same time should be conclusive evidence of this.

Urine contaminated with vaginal secretions, especially during heat periods, may show large numbers of squamous cells as well as red blood cells and leucocytes, for which an allowance should be made.

Spermatozoa can be identified without difficulty. If the urine is examined soon

after it is collected, they are usually quite motile.

Red blood cells are often overlooked, as they do not occur frequently or often in large numbers in the dog.

Leucocytes may be mistaken for small epithelial cells if only a few are present. They are changed by the urine to the extent that the nuclei are not easily seen. If present in large numbers, as they often are in pyelitis or pyelonephritis, they hardly can be confused with anything else. If in doubt, make a smear of pus from the sheath of a male dog, and the comparison will help considerably.

Blood-Urea Determinations.—All of the approved methods for blood-urea determinations require expensive equipment that makes this procedure impractical for most veterinarians. However, I have found the Hensch-Aldrich method¹⁻³ dependable and economical. Outside of a centrifuge, the total cost of equipment and reagents should not exceed \$4.00. While it is probably not as exact as some methods, it nevertheless gives results within the limits required for clinical accuracy. I have found it useful in diagnosing and noting the progress of cases of nephritis in which urea retention is a serious factor.

TREATMENT

Much of what is said about treatment in veterinary textbooks is based upon human medicine. Since our patients are of a different species and since nephritis in the dog does not exactly parallel that in man, we adapt our treatment to the situation as we find it. Some of the methods used by the physician can be used to advantage by the veterinarian.

In cases accompanied by much albumin in the urine it is doubtful if infection takes any part; hence, urinary antiseptics are not indicated. Diuretics in general are contraindicated as they would act only as a whip to an already overloaded organ. Since vomiting is common, treatment by the mouth is of no avail when this is present. If dehydration is apparent, fluids should be administered intravenously, intraperitoneally or subcutaneously. (Pulling up the

dorsal cervical skin and noting how rapidly or slowly it regains its former position is a good way to judge this. The slower it retracts, the more pronounced is the dehydration.) In the dog saline solution may be used, since chlorides are not retained as often as they are in human nephritis. As long as dehydration persists and edema does not develop, and it rarely does, saline can be continued. For variety an isotonic solution of dextrose may be substituted or even an isotonic solution of sodium bicarbonate in smaller quantities, especially if acidosis is suspected. Dextrose is the only diuretic advisable, and even this should be used with caution. It serves a double purpose in that it acts also as a source of energy. It may be given as above or in a 50 per cent solution intravenously.

In those cases in which infection seems to play a part, there is a wider range of therapeutic measures. Infection can be ascertained with reasonable certainty only by staining the urinary sediment or culturing the urine. For most of us this is not feasible. A rational substitute would be to assume that there is an infection if albuminuria is slight and leucocytes are found to be fairly plentiful in the sediment.

As a urinary antiseptic methenamin is probably used most widely. Its effectiveness depends upon the liberation of formaldehyde in the urine. Thus, an acid urine is essential and the pH should be 5.5 or lower, and kept there. To accomplish this it is often necessary to give acid phosphates or ammonium chloride at the same time. Both are gastric irritants and are not well tolerated. These drugs should be given in large doses and stopped if bladder irritation sets in. It is well to follow this with a drug that functions to advantage in an alkaline urine, such as acriflavine. Sodium bicarbonate should be given with it. Stop treatment if gastroenteric disturbance becomes established, which will happen if it is given too long.

A few years ago it was found that some of the common pathogenic bacteria affecting the urinary tract can not survive in a highly acid urine. To secure this acidity a high fat diet was used until a ketosis be-

came established. This was a clumsy way of securing results and, at the same time, it was repulsive to the patient. Later, it was found that mandelic acid gives the same results and affords the patient a more palatable diet. Mandelic compounds, such as calcium or ammonium mandelate, are available now and do not cause as much gastric distress as the acid. The urine reaction should be maintained at pH 4.5 or less. Hydrochloric acid or ammonium chloride sometimes must be given with the compound to maintain the proper acidity. If blood appears in the urine, treatment should be stopped. Best results are claimed for this if Gram-negative organisms are present.

Sulfanilamide and neoprontosil have a definite value here, not only when streptococci are present, but also when members of the colon group are implicated. The reaction of the urine does not need to be taken into account. When there is no vomiting, sulfanilamide may be given by the mouth. If vomiting is present, neoprontosil may be given intravenously or with dextrose or saline.

The normal kidney absorbs from 70 to 80 per cent of the sulfanilamide which filters through the glomeruli; hence, it is not difficult to maintain proper concentrations of the drug in the blood. If there is tubular damage, the absorption is increased with a corresponding increase in the sulfanilamide concentration in the blood. For this reason the patient should be watched for signs of poisoning.

Pyridium, serenium and azo dyes are effective in either alkaline or acid states. Their chief disadvantage is their cost. Azamine is probably the most popular in veterinary circles.

Hexylresorcinol is reported to be an effective antiseptic in chronic infections due to staphylococci, but its cost is prohibitive in most instances.

It should be remembered that the ideal urinary antiseptic has not yet been found, and it is doubtful if one ever will be found. It is advisable to choose one urinary antiseptic and use it for a reasonable time. If

there is no improvement, another should be tried.

In mild nephritis, fluid extract of saw palmetto and sandalwood seems to be helpful in many cases, but it should not be used in patients which are noticeably or gravely ill.

DIET

For generations it has been the custom to restrict proteins, especially meat, in the diet of human cases. The theory of this practice was that it kept the blood urea at lower levels. The trend now is toward more protein in human practice. In dogs which still have some appetite, it is probably advisable to reduce the amount of meat and increase the amount of milk and carbohydrates. To eliminate meat entirely would be, in my opinion, a poor policy, as meat is often the only food that dogs will consume voluntarily. If there is a considerable loss of blood protein through albuminuria, it would seem to be logical to feed meat in order to compensate for this loss. In chronic states a reduction in proteins and an increase in the carbohydrates given is advisable. In these cases the vitamin intake also should be increased.

Since there is often a marked loss of weight in this disease, any measure that may help to limit it should be tried. Force feeding may be resorted to but should not

be employed too often. Malted milk tablets or malted milk or powdered milk in large gelatin capsules can be administered easily. Feeding in this manner is, of course, inadvisable if vomiting takes place. In this case it is probably better to rest the digestive tract and rely upon dextrose intravenously or upon blood transfusions.

In normal dogs a high vitamin A diet will markedly increase the elimination of blood urea up to a certain point. Since vitamin A seems to be intimately concerned with some epithelial structures, it might be well to administer it to these cases.

CONCLUSION

Nephritis in the dog has attracted much attention among American veterinarians in the past few years, and not without reason. It is a disease in which there is still room for considerable investigation. Certainly, there is something to be hoped for in the way of etiology and therapeutics. It occurs much more frequently than most of us suspect and, for this reason, I am confident that we have overlooked many cases in the past.

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Memphis on the Mississippi — recalls the 76th annual meeting of the Association.



Office Help and Lay Attendants: Their Relationship to Successful Hospital Management*

By CHARLES C. RIFE, D.V.M.

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IT OFTEN has been said that the "non coms" run the army under the direction of the officers. To a certain extent, this holds true in a veterinary hospital, for without competent help a modern veterinary hospital can not function efficiently.

Most of us did not receive instructions in college as to how to manage a hospital, either from a monetary viewpoint or from the standpoint of labor. The solutions of these problems are to be found only in experience, which is often costly.

Let's start in the reception room or business office, where the client comes in contact with the office girl or some member of the staff. If the veterinarian is busy in the hospital or on a call, the receptionist or some lay helper will meet the client. The greeting and an invitation to have a seat until the doctor or his assistant is free will have a favorable influence on the client. A light conversation between the receptionist and the client—perhaps a few preliminary questions concerning the nature of the pet's ailment—is helpful. In my office the girl rings a bell for one of the attendants to get the dog and kennel it, or hold it in the examination room until either I or my assistant is free to give attention to the patient.

My office girl keeps all records pertaining to the cases in the hospital and also to the accounts. She enters the patients in the hospital and notifies the owners when they are ready to be sent home. She also gives information to owners concerning the progress of the various cases. I have instructed her to say, "Dr. Rife says the patient is doing so and so." This lends a personal touch that would be lacking if she did not use my name.

I always let my office girl attend to the

billing. If a personal friend is a client, he may feel that a concession should be made. When I am questioned as to a bill, I explain that the girl at the desk handles the accounts. Obviously, this saves me time and money.

In my experience, up-to-date, accurate records are indispensable. They instill confidence and lend authority when there is a dispute over a bill or a case. An office girl with a pleasing personality usually can adjust such matters and still retain a pleased client without the veterinarian's becoming involved. By virtue of this system I am seldom forced to take part in a business transaction.

The amount of lay help depends upon the size of the practice, both as regards the number of animals hospitalized and treated, the net profit, and the prevailing wage scale. I believe that here in the South the ratios should be about the same for all practitioners who maintain hospitals, since labor is not costly and the fees and operating expenses do not vary significantly.

Last spring E. B. Dibbell of Baltimore gave a paper on hospital management at the A.A.H.A. meeting in Miami. He stated that the operating expenses in a hospital should average not more than 50 per cent of the gross income, provided that the practice has a \$15,000 to \$30,000 range. Of this 50 per cent operating expense (which I have found to be an accurate figure) I find that the labor expense runs between 15 and 20 per cent. This will fluctuate according to the gross income for the month, since the payroll remains constant. With that percentage of the gross income allocated for labor, what type of help can one hire? Surely, high school graduates can not be secured to do kennel and janitor work.

I have three kennel men, besides my assistant and office girl. The highest I pay a kennel man is \$15.00 per week. It is

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almost impossible to hire anyone with education for that amount, unless he is a negro or single boy. Also, there is the problem of keeping the boy on the job once he is hired. Thus, the salary one pays or can pay profitably will determine the type of men who may be secured. I believe that the average salary for lay attendants in the South is about \$15.00 per week. On this salary, of course, they can not afford many clothes. Therefore, in order that they may appear neat, uniforms should be provided. Dog owners are inclined to judge a veterinarian by the appearance of his help and, from this standpoint, an investment in uniforms is a sound business principle.

What should one train the laymen to do? I delegate one man to do the stripping, cleaning and bathing of dogs, and hold him responsible for this. Giving good service along these lines helps to build a practice. It is done easily, brings in a good revenue, and results in a well-pleased client when the job is done efficiently. A man should be on the staff who is capable of feeding dogs properly. The kennel men should be able to recognize some of the symptoms of diseases, such as gastritis, where water must be withheld. In cases where there is diarrhea, I allow an attendant to administer an astringent or anti-diarrhea medicine. Naturally, this man should know the action of some of the more simple drugs. I have shown my attendants what to use as an antidote for strychnine poisoning and how to give other emergency treatments. This often saves a client's pet and, I believe, a client, as there are times in all hospitals when a veterinarian is not on duty.

There should be some man in the organization who knows how to keep a hospital clean and well policed. Most lay helpers can not see dirt, and if they do, they are usually reluctant to clean it up. A dirty hospital is obnoxious to most clients and will be avoided if there is a neat one in the locality. A boy or man with a good education dislikes being a janitor, and the man who has not had an education can not see the dirt. I find it rather difficult to keep my help busy cleaning the hospital. It seems that when they are not working with the

animals, they want to sit down. This time should be used in cleaning up the hospital, unless there is sufficient income to warrant hiring someone for janitor service alone. In small hospitals one layman can do this task but in large hospitals this work should be distributed among all of the staff members.

In the animal-transportation service of the army, a stable sergeant's manual has been prepared which offers instructions as to care and feeding, as well as information about common ailments that the privates and stable men should know. Perhaps a similar manual could be prepared whereby specified duties, first-aid treatment and hospital practices could be more or less standardized so that the lay help could study these important matters pertaining to the operation of a veterinary hospital. The argument may be advanced that such a book might educate quacks, but I am inclined to doubt this.

I am confident that human hospitals could not be operated efficiently without the services of trained people. Why, therefore, should we expect a modern veterinary hospital to be any different?

The Lard Surplus

As of April 13, 1940, there were 269,284,000 lbs. of lard in the United States awaiting liquidation. This figure is higher by 11,225,000 lbs. than it was during the month of March, due, the reports say, to the price paid for corn that is sealed by the government. Corn at the seal price is more profitable than hogs. On the contrary, pork in the stage of process and in storage did not increase at the same rate, showing that lard going on the markets in competition with popular vegetable fats is more vulnerable to the handicap of surpluses than the other pork products.

As a matter of fact, what to do with our lard has become a difficult problem to solve even though fats are scarce among the nations at war. The tremendous output of carbohydrate in the Corn Belt and the ease with which hogs can transform it into fats is an agricultural problem of the upper cadre.

Neoplasms in the Mammary Gland in Dogs, Their Pathology and Surgical Treatment*

By CARL F. SCHLOTTHAUER, D.V.M.

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THE MAMMARY GLANDS of dogs are a frequent site of tumors. Various histological types of neoplasms have been observed in this situation, but a large proportion of them are so-called mixed tumors. These commonly grow slowly and usually occur in dogs of advanced age; therefore, the clinical importance of mammary tumors in the dog sometimes is not fully appreciated.

Observations indicate that most of the mammary tumors occurring in dogs are progressive and, if left undisturbed, many become unsightly ulcerating masses and some are definitely malignant and will metastasize to other organs. Unfortunately, adequate treatment is not always possible, because some highly malignant mammary neoplasms metastasize early or the dog's physical condition may be so poor that surgical treatment seems inadvisable.

This paper will deal briefly with the pathology and surgical treatment of mammary tumors in dogs. Twenty-two cases will be considered.

The literature contains reports of many cases of primary mammary neoplasms occurring in various domesticated and wild mammals. The incidence of these tumors in the various species has been reviewed by Joest¹ and Feldman.² These reports definitely show that mammary neoplasms are more frequent in the dog than in other species.

As previously stated, a large proportion of the tumors occurring in the mammary glands of dogs contain more than one type of neoplastic tissue and commonly are classified as mixed tumors, but simple forms of neoplasms are not infrequent. Sticker³ recorded 766 instances of carcinoma in

dogs. In 341, or 44 per cent, of the cases the neoplasm occurred in the mammary glands. Crocker⁴ observed tumors in 49 dogs. Sixteen of these occurred in the mammary glands and were classified as carcinoma. Feldman² studied 78 canine tumors; 28 were classified as carcinomas and three occurred in the mammary glands. Jackson⁵ observed 72 tumors which had been removed from dogs; eight of the tumors occurred in the mammary glands. One of these neoplasms was classified as a simple adenocarcinoma and a second one was classified as a fibroadenoma. The latter tumor occurred in the breast of a male dog. The remaining six mammary neoplasms were classified as mixed tumors.

The writer has observed 22 instances of mammary tumors in dogs. In seven cases the neoplasm was a simple tumor and in 15 cases it was a mixed tumor. For convenience, the cases of simple tumor will be considered individually and the other cases will be considered as a group.

Report of Cases

Case 1.—The dog in this case was 18 months old. A tumor had been present in the third mammary gland on the left side for a month or longer. The tumor was situated in the glandular tissue at the base of the nipple. It was 3 to 4 cm. (1.2 to 1.6 in.) in diameter, soft and not attached to the skin. Because of the dog's age, the tumor was thought to be either an inflammatory mass or a fibroadenoma. The tumor together with the affected portion of the third mammary gland was excised surgically. The nipple was not removed. Microscopic examination revealed that the tumor was an inflammatory mass. A good result was obtained.

Case 2.—An aged spayed female dog was brought in to be destroyed. Necropsy revealed a hard, partially calcified nodule, 3 cm. (1.2 in.) in diameter, in the third mammary gland on the left side. It was not known how long this tumor had been present. Microscopic examination revealed that the tumor was a degenerating, calcified fibroma. The owner stated that

*From the division of experimental medicine, The Mayo Foundation; presented at the North Carolina veterinary conference, Raleigh, N. Car., January 23-25, 1940.

the dog had been spayed at 5 years or more of age. It is possible that a small neoplasm was present and unnoticed at that time and that the tumor might have been a degenerating adenofibroma.

Case 3.—A soft tumor was present in the posterior mammary gland on the right side of a dog that was 6 years old. The owner stated that this neoplasm had been noted less than two weeks before the dog was seen by the writer, and that it appeared to be increasing in size. The tumor was approximately 4 cm. (1.6 in.) in diameter. It was situated in the glandular tissue and was not attached to the skin. Because of the history of progressive growth and the character of the lesion, the posterior two (fourth and fifth) mammary glands, nipples and inguinal lymph nodes on the right side were excised in the usual manner. The wound healed rapidly and an apparent good result was obtained. Microscopic examination revealed that the tumor was composed chiefly of hyperplastic fibroblasts. The epithelial elements of the gland appeared to be only slightly affected. The neoplasm was classified as an adenofibroma. It appeared to be largely intracanalicular (fig. 1).

Case 4.—A dog, 8 years old, was brought to the writer because of a large ulcerating mass in the posterior mammary region. The owner stated that one of the posterior nipples was the primary site of the neoplasm, which had been present for several weeks.

The neoplasm involved the glandular tissue, nipples and skin of the posterior two mammary glands on each side and extended for a distance of 8 to 10 cm. (3.1 to 3.9 in.) down the inside of each thigh and backward to the vulva. Multiple cutaneous nodules of varying size were present. Because of the extensive involvement, the lesion was considered inoperable. At the owner's request, the dog was destroyed by the administration of a lethal quantity of pentobarbital sodium. Necropsy revealed that the neoplasm was localized in the mammary gland and skin. Histological examination revealed multiple solid masses or nests of very active squamous epithelium. Mitosis was frequent. The glandular epithelium and connective tissue were only slightly hyperplastic. The neoplasm was classified as a squamous-cell carcinoma (fig. 2). It probably originated in the duct of the nipple and was a Paget's type of carcinoma of the breast.

Case 5.—This case was previously reported by Stalker and the writer.⁶ The primary neoplasm was situated in the first mammary gland on the left side and measured 6 by 6 cm. (2.9 by 2.9 in.) It was attached to the skin and felt soft or cystic. The owner stated that the tumor had been present for a month or longer and had been growing rapidly. The dog was 9 years of age and appeared to be in good physical condition. The tumor together with the

affected portion of the first mammary gland was excised surgically. Convalescence was uneventful.

Microscopic examination revealed that the neoplasm was composed chiefly of compact, diffuse epithelial cells. There was evidence of abundant mitosis and rapid growth (fig. 3). In some regions it appeared to be forming glands or acini. A small quantity of calcareous material was present in one portion of the tumor, but this was encapsulated and had the appearance of having been present a long time. There was only slight hyperplasia of the connective tissue elements. The neoplasm was classified as a highly malignant adenocarcinoma.

The dog remained in apparent good health for 2½ years following surgical excision of the primary neoplasm. A slight icterus and dyspnea then developed. Examination revealed evidence of metastatic involvement. Because of her apparent hopeless condition, she was destroyed by inhalation of ether. Necropsy revealed metastatic neoplasms in the lungs, heart,

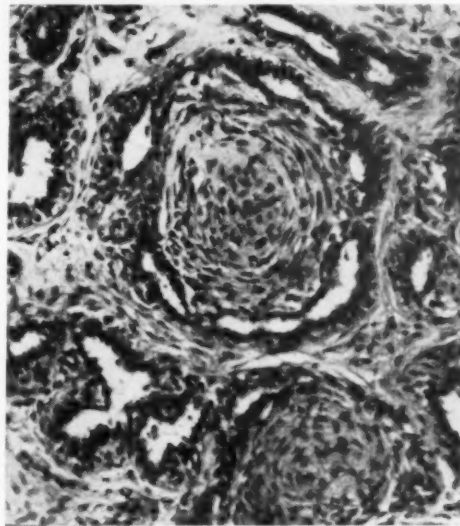


Fig. 1. Intracanalicular fibroadenoma (x 145).

liver, kidneys, pancreas and duodenum, but there was no evidence of local recurrence. Microscopic examination of the metastatic neoplasms revealed them to be similar to the primary tumor excised from the breast 2½ years previously.

Case 6.—This case also was reported previously by Stalker and the writer.⁶ The dog was 12 years old. She was brought to me because of a firm nodular, rapidly growing mammary tumor which had been present for several months. Examination revealed a firm nodular tumor affecting the posterior two (fourth and fifth) mammary glands on the right side and a smaller but similar tumor affecting the posterior, or fifth, mammary gland on the left side.

Both tumors were attached to the overlying skin. The mass on the right side measured 8 by 10 cm. (3.1 by 3.9 in.) and that on the left side measured 3 by 3 cm. (1.2 by 1.2 in.) The dog was in apparently good physical condition. The tumors and the third, fourth and fifth

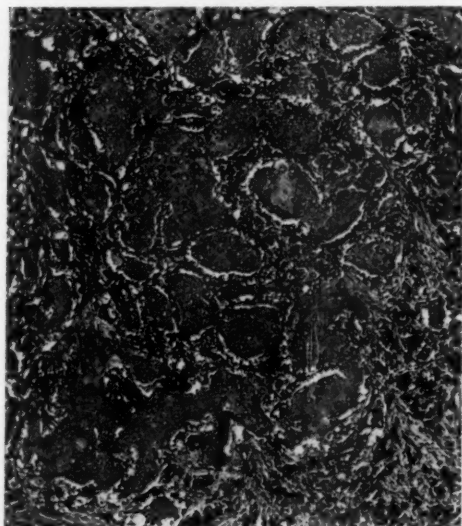


Fig. 2. Squamous-cell carcinoma (Paget type); one may note the compact masses or nests of squamous cells ($\times 63$).

mammary glands on the right side, the fourth and fifth mammary glands on the left side, and the inguinal lymph nodes were excised through a bilateral elliptical incision. Convalescence was uneventful.

Microscopic examination revealed that the neoplasm was characterized by hyperplasia of the connective tissue elements (fig. 4). The process had developed to such a degree that most of the normal epithelial elements had been replaced. The tissue showed a more or less diffuse deposition of epithelial cells with a few duct-like structures remaining. The vascular channels were few and of small diameter. The neoplasm had invaded one small vessel, but other evidence of aggressiveness was not marked. Microscopic examination of an excised inguinal lymph node revealed a small nodule of tumor cells. The neoplasm was classified as a fibrosarcoma of the mammary gland. Because of the demonstrable invasion of the vascular system and of the inguinal lymph node, a poor prognosis was given.

The dog remained well for six months and then began to fail in health rapidly. Clinical examination was negative, but the presence of metastatic tumors in the lungs was suspected. Because of the dog's apparent hopeless condition, she was destroyed by inhalation of ether. Necropsy revealed metastatic tumors in the lungs, heart and kidneys. The upper portion

of the left lung had been replaced entirely by a firm, gray tumor, and the entire pleural surfaces of both lungs were studded with circumscribed gray nodules 1 to 2 cm. (0.4 to 0.8 in.) in diameter. Five or more similar nodules were observed in the wall of the heart and in both kidneys. The left kidney had been almost entirely replaced by neoplastic tissue. There was no evidence of recurrence in the breast. Microscopic examination revealed that the metastatic neoplasms had the same general histological character as the primary tumor of the breast.

Case 7.—This case was previously reported by Thurber and the writer.⁷ The dog was 12 years old. The primary neoplasm was situated in the third mammary gland on the right side. The owner stated that the tumor had been noted for several weeks and had increased slowly but progressively in size. At the time of our examination it was approximately 10 cm. (3.9 in.) in diameter, slightly irregular in shape, smooth

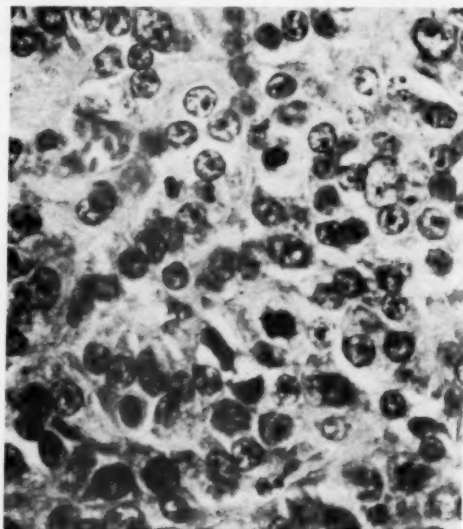


Fig. 3. Adenocarcinoma; one may note the absence of other tumor elements; the cells tend to form glands or acini ($\times 640$).

and hard. The mass was attached to the overlying skin but was freely movable. Metastatic tumors were not observed. Because of the gross character of the tumor, we thought that it might be a comparatively benign mixed tumor, and surgical removal of the mass was advised. The dog was in poor physical condition and a minimum of dissection seemed advisable. Therefore, the tumor together with the affected portion of the third mammary gland was excised. The wound healed rapidly and the immediate results of the operation were satisfactory.

Microscopic examination disclosed that the tumor was composed of sarcomatous osteoblasts, osseomucin and adult osseous tissue (fig. 5).

Mitosis was marked in some regions, which indicated rapid growth. This neoplasm was classified as an osteogenic sarcoma and a poor result was anticipated.

Local recurrence of the neoplasm was noted the third week following the operation. Because of the histological character of the neoplasm and the dog's poor physical condition, a second operation was not advised. The recurrent tumor grew rapidly and in two months attained the size of the original tumor (10 cm. in diameter). It was an irregular-shaped, smooth, hard, subcutaneous tumor. It was not attached to any of the osseous structures and was freely movable. Roentgenograms at this

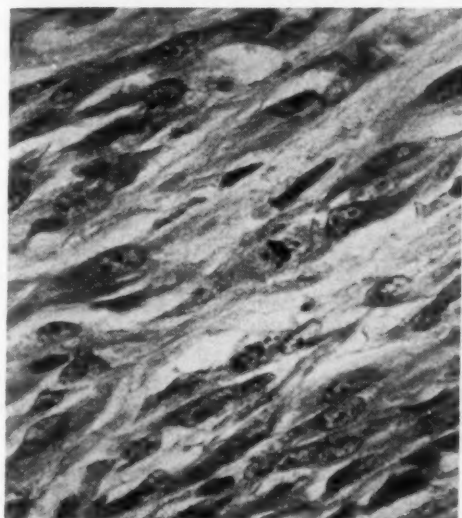


Fig. 4. Fibrosarcoma (x 555).

time revealed osseous metastatic tissue in a lymph node in the right axilla and definite nodules in both lungs. Because of the apparent hopeless condition of the dog, she was destroyed and a necropsy was performed.

The involved lymph node in the right axilla was 3 by 5 cm. (1.2 by 2 in.) in diameter and contained bone. Metastatic lesions were present in both lungs, the heart and the right kidney. The neoplasms in the lungs appeared to be growing within the vessels. Adult osseous tissue was encountered in the recurrent neoplasms and in many of the metastatic nodules. Microscopic examination of the recurrent tumor and metastatic nodules revealed the same cell type and histological structure as found in the primary neoplasm. The metastatic nodules were composed entirely of sarcomatous osteoblasts, osseomucin and osseous tissue.

Comment on Case 7.—The origin of a primary osteogenic sarcoma in a mammary gland can be the result of a one-sided development in a teratoid tumor but the writer is inclined to agree with Broders⁸ and Feldman,² who ex-

pressed the opinion that the sarcomatous osteoblasts in such neoplasms as this are the result of metaplasia of multipotent connective tissue fibroblasts.

MIXED TUMORS

The mammary neoplasms in the remaining 15 cases contained more than one neoplastic element and they were classified as mixed tumors.

In two of the 15 cases the lesion was considered inoperable because of the poor condition of the dog and extensive local involvement. In a third case the lesion was considered inoperable because metastatic tumors could be palpated in the abdomen. The metastatic neoplasms were chiefly epithelial in structure, whereas the primary neoplasm in the mammary gland was definitely mixed and contained cartilage and deposits of calcium.

In eight of the cases the dogs were treated surgically. In all of these the dogs survived the operation and seven of the eight dogs were apparently cured permanently. In the eighth case a local recur-

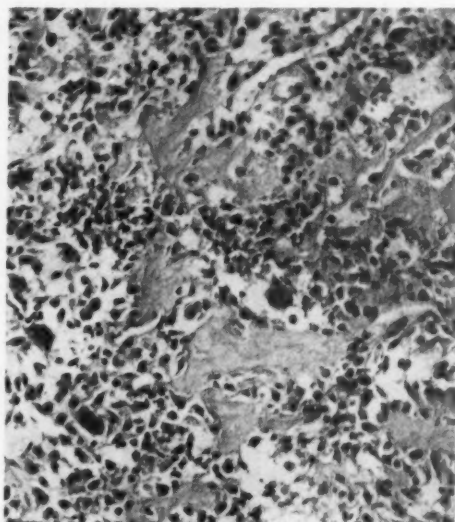


Fig. 5. Osteogenic sarcoma; one may note the osteoblasts, osseomucin and adult osseous tissue (x 145).

rence and metastasis developed. This probably was due to inadequate operation, because only the tumor and the affected portion of the breast were excised at operation. The metastatic tumors in this case

were composed of epithelial elements and were classified as adenocarcinomas.

Treatment was not desired in the remaining four cases. The dogs were destroyed by the administration of a lethal quantity of pentobarbital sodium. Necropsy did not disclose metastatic neoplasms.

Classifying neoplasms as mixed tumors because they contain more than one neoplastic tissue is convenient, but it does not indicate the grade of malignancy of the tumor. All of the mixed tumors of the mammary gland contain epithelial tissues, and in many it was very active. Broders⁸ has often mentioned that carcinoma of the mammary gland frequently imitates sarcoma. Ewing,⁹ in discussing mixed teratoid tumors of the breast, said that "close histological study appears to show every stage of metaplasia from the ordinary gland and stroma cells of the breast into cartilage, bone and squamous epithelium." It is possible that all of the mixed tumors are carcinomas and that their true identity and behavior are obscured by an overgrowth of the connective tissue elements. The cartilage and bone seen in these tumors may arise from multipotent fibroblasts. One can find much evidence in some mixed tumors to support such a theory. Since the mixed tumors in the mammary gland commonly contain some active epithelial tissue, and because some are malignant and will metastasize, it would seem that it might be more practical and safer to classify such tumors as carcinomas and grade them according to Broder's¹⁰ classification. By using this classification, a tumor which had a low grade of malignancy would be classified as carcinoma, grade 1 or 2, and one that was highly malignant would be classified as carcinoma, grade 3 or 4.

ETIOLOGY

There probably are various causes for mammary neoplasms. Ewing⁹ mentioned that a large proportion of cancers of the breast in women occur in breasts that are the seat of chronic mastitis. He stated that in his own material, pronounced precancerous changes or miniature carcinomas were present in about 50 per cent of

the breasts excised because of chronic glandular mastitis.

Undoubtedly, inflammatory disease, that is, mastitis, is the cause of some benign tumors and it may also stimulate development of a malignant neoplasm in animals which have an inherent tendency for the development of these tumors. It is well known that inflammatory lesions and fibrosis occur frequently in cows, but malignant mammary neoplasms are rare in this species of animals. It also is important to note that neoplasms do not develop in all of the breasts of dogs which are affected with mastitis. Observations tend to indicate that hereditary predisposition for carcinoma possibly is one of the essential requirements for the development of a mammary cancer.

A certain relationship exists between the ovaries and the occurrence of mammary tumors in the dog. This relationship, however, may be remote. It has been demonstrated by Severin¹¹ and other workers that non-function and atrophy of the mammary glands always result following oöphorectomy on the dog. Mammary neoplasms rarely occur in spayed females and some mammary tumors decrease in size or disappear following oöphorectomy on the dog.¹² It therefore appears that the development of a mammary tumor is dependent upon a normal or functioning mammary gland and that the latter is dependent upon the presence of the ovaries. Unfortunately, the histological structure of all tumors that react favorably to oöphorectomy is not known. It would seem doubtful that oöphorectomy would cause atrophy of a carcinoma, grade 3 or 4, or of a sarcoma. This treatment has been tried on women by various surgeons, but rarely does distinct inhibition of the neoplasm follow castration.⁹

TREATMENT

No treatment for mammary neoplasms in the dog is entirely satisfactory, but it is the writer's opinion that surgical removal of the tumors and affected breasts gives the best results. To obtain the best results, as well as for safety and conveni-

Axillary lymph node

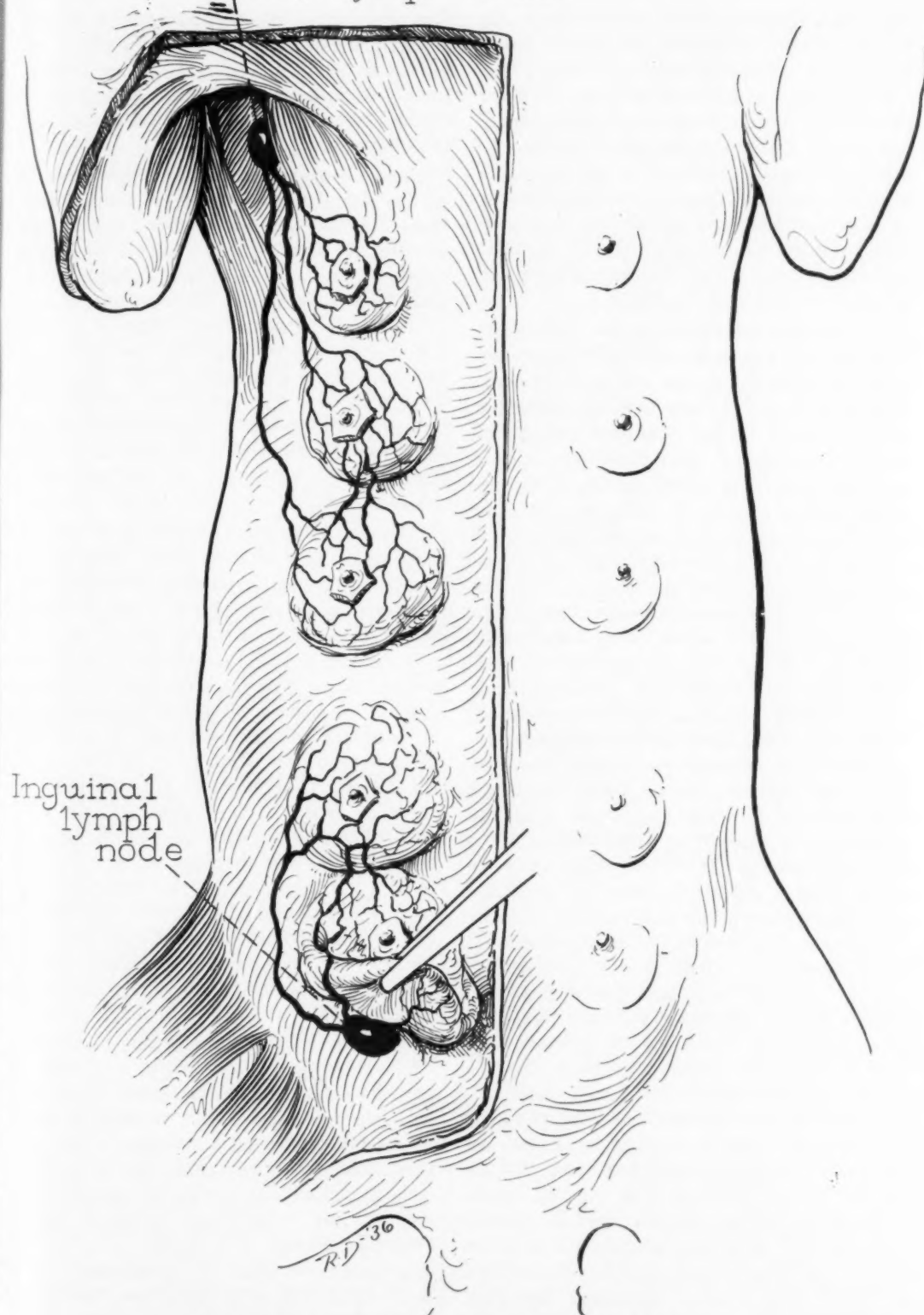


Fig. 6. The lymphatic drainage of the mammary glands of dogs.

(637)

ence, this should be done early, while the tumor is still small and localized. However, good results frequently follow surgical excision of large or multiple tumors and one should not advise against operation unless the lesion is definitely inoperable. (A lesion might be termed inoperable because of extensive local involvement or demonstrable metastasis of the neoplasm, or the patient might be in too poor physical condition to warrant attempting surgical removal of the lesion.)

One must, however, recognize that advising against operation in such cases can only temporarily delay a fatal outcome. One should not advise against operation merely because a dog is old and has about reached her normal life expectancy. This sometimes is done because the tumor is small and it is thought that the dog may die of other natural causes before the neoplasm becomes sufficiently large to cause discomfort or appear unsightly. Unfortunately, this frequently results in disappointment, because a dog often lives longer than is anticipated, or the tumor suddenly enlarges rapidly or it degenerates and ulcerates. It must always be borne in mind that neoplasms have a tendency to remain and progress, and that the surgical removal of a large tumor in an old dog is always more hazardous than the surgical excision of a small tumor in a younger animal. It is true that in some cases dogs succumb because of metastatic tumors following surgical removal of the primary lesion, but the metastatic nodules may have been present but not visible when the operation was performed. In such cases, advising against surgical treatment will not cure the patient and will not greatly prolong life.

Stalker and the writer⁶ noted that various surgical procedures for the treatment of mammary tumors in dogs have been described, but we thought that none of them adequately explained how much tissue should be excised. In the case of human beings, the mammary gland is a common site of neoplasms and a well-standardized and effective surgical treatment has been developed. This treatment is based on the

fact that most of the neoplasms in the breast are carcinomatous and that they begin as a localized lesion which is disseminated to other parts of the body by the lymph stream and, occasionally, by the blood stream.

Since neoplasms of the mammary gland of the dog are comparable in general with those of the mammary gland of human beings, it occurred to Stalker and the writer⁶ that a similar standardized surgical treatment should likewise be effective in the dog. Since we were unable to find a complete and satisfactory description of the lymphatic drainage of the mammary glands of the dog, we first studied this and then developed a standardized procedure for the treatment of neoplasms situated in one or more of the mammary glands.

Gross observation revealed that most female dogs have five pairs of nipples and mammary glands extending from the pectoral region to the inguinal region. These are arranged five on each side of the ventral median line. These glands usually are designated as two pairs of pectoral glands, one pair of abdominal glands and two pairs of inguinal glands. Because of frequent variation in the number of these glands we decided to designate them by number, 1 to 5, from before backward, on each side. The first pectoral mammary gland is No. 1 and the last inguinal mammary gland is No. 5. These glands are separate from each other, but the posterior two (Nos. 4 and 5) commonly are confluent. In dogs having only four pairs of mammary glands, the abdominal, or third, pair usually is absent.

The lymphatic channels were made visible by injecting 1 to 2 cc. of a dilute (50 per cent) solution of black India ink into multiple regions of each mammary gland of anesthetized lactating dogs. The skin was immediately reflected surgically to expose the glandular tissue and surrounding region. The ink appeared in the lymphatic channels almost simultaneously with the injection. A separate interlocking capillary meshwork of lymphatics was noted for each gland (fig. 6).

It was noted that the lymphatic drainage was similar on each side. The lymph from mammary glands 1, 2 and 3 always flows forward to the axillary lymph node, whereas that from glands 4 and 5 flows posteriorly to the inguinal lymph node. It was observed that the lymph from mammary glands 1 and 2 drained directly by separate channels to the axillary lymph node. The lymph from mammary gland 3 drains into the meshwork of gland 2 and also, by a separate channel, into the axillary lymph node. The lymph from gland 5 drains directly into the inguinal lymph node and gland 4 drains into the lymphatic meshwork of gland 5 and, by a separate channel, into the inguinal lymph node. In a few instances small lymphatics seemed to penetrate the superficial muscle layer partially beneath the mammary gland, but in no instance were the lymphatic channels observed to penetrate the abdominal or thoracic walls nor to anastomose with lymphatics on the opposite side of the median line. It probably is true, as is seen in other regions of the body, that some lymphatics in the mammary gland may communicate directly with the vascular system, but we were unable to demonstrate this. Such direct communication with the vascular system may account for internal metastasis without involvement of the inguinal or axillary lymph nodes in some cases.

These observations enabled us to outline a standardized surgical procedure for the resection of tumors variously situated in the mammary glands. It is evident that if a neoplasm is situated in mammary gland 1, it would be necessary to resect only the tumor and the affected gland. However, if a neoplasm is situated in mammary gland 2, the tumor and glands 1, 2 and 3 on the affected side should be excised. A similar procedure should be adopted if the neoplasm occurred in mammary gland 3. However, if the neoplasm is large and contacts gland 4, it is considered advisable to remove all of the mammary glands on the affected side. Because of the close proximity to each other of mammary glands 4 and 5, it seems always

advisable to remove both of these glands and the inguinal lymph node when a tumor is present in either of these glands.

Stalker and the writer⁶ mentioned resection of the axillary lymph node in all cases in which a neoplasm occurs in mammary glands 1, 2 or 3. The writer's records do not indicate that it is necessary to adopt this as a regular procedure. It, of course, would have eliminated one metastatic tumor in one of the cases in which the writer operated, but it probably would not have made much difference in the final outcome. The axillary lymph node is situated deep in the axilla in the dog; it is difficult to excise but this can be accomplished with safety.

The incision for the removal of a tumor or a mammary gland may be elliptical or straight, but it should be made as far from the neoplasm as is possible. Likewise, one should avoid rough manipulation of all neoplasms because this sometimes dislodges malignant cells and causes embolic metastasis to distant organs. The subcutaneous lymph bearing fascia should be removed down to the abdominal muscle. It is always better to remove more tissue than is necessary than to remove too little.

Excision of a mammary gland usually is accompanied by severe hemorrhage. All bleeding vessels should be clamped and ligated. This makes the operation easier, conserves the strength of the dog and aids in the healing of the wound. When the posterior mammary glands are being excised, one can control some of the hemorrhage by ligating the mammary artery before excising the glands. Excision of the mammary glands, once the skin is incised, can be accomplished by blunt dissection or by using a pair of scissors, a knife or a cautery. The writer usually uses a pair of scissors and removes the glands by blunt dissection.

The wound should be closed with carefully placed subcutaneous and cutaneous sutures. All subcutaneous pockets must be obliterated, or hemorrhage will occur in them and delay healing. When large amounts of tissue have been resected and it is necessary to stretch the skin to close

the wound, the writer sometimes places a pressure bandage over the site of the operation for 24 hours or longer to hold the skin in close apposition with the underlying muscles.

Oöphorectomy has been shown to cause inhibition of some mammary neoplasms in dogs. This operation may be performed at the time of surgical excision of the neoplasm. It seems, however, that if complete excision of the tumor and mammary glands is possible, the additional hazard of oöphorectomy is not warranted.

The general use of roentgen rays pre-operatively or post-operatively in the dog is not recommended, but in certain selected cases it might be beneficial.

The post-operative care of these dogs should be the same as that of any other dog that has undergone a major operation.

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The exact source of lightning is not known. It is supposed to be released when moisture condenses into drops of rain. Lightning strokes of high amperage shatter what they hit; if of low amperage, they set fire to it.

Tularemia in the Tropics

The first cases of tularemia in tropical countries are reported from French West Africa. The patients' serum reacted to the agglutination test in relatively high titres. The author advises physicians and veterinarians to make systematic observations and researches on the affection. (*Abst., Bulletin des Services Zootechniques et des Epizooties, iii, October 1939, p. 31.*)

Artificial Rubber

Synthetic rubber made from coal, water and air at pre-war (1914) prices, comparable with natural rubber in resilience and more resistant to oils and oxidation, will be available to the American people should the source of natural rubber be cut off by war or other cause, said Livingstone of the du Pont research laboratory in an address before the American Chemurgic Conference in Chicago the past March. From Italy it is reported that tomatoes are also good raw material for making artificial rubber.

Important Laboratories of Biological Research in the Southern States

Besides the research laboratories conducted in connection with the agricultural experiment stations of each state, the South can point with pride to the following institutes of worldwide fame engaged in investigational work:

- Animal Disease and Parasite Laboratory, Angleton Station of the Texas Agricultural Experiment Station, Angleton, Texas.
- Department of Preventive Medicine, Vanderbilt University, Nashville, Tenn.
- Station for Malaria Research, Tallahassee, Fla.
- Department of Parasitology, Tulane University, New Orleans, La.
- Department of Tropical Medicine, Louisiana State University, Baton Rouge, La.
- School of Tropical Medicine, San Juan, Puerto Rico.
- Regional Research Laboratory, U. S. Bureau of Animal Industry, Auburn, Ala.
- The Rockefeller Institute for Medical Research, Montgomery, Ala.
- Pathological Division, U. S. Bureau of Animal Industry, Branch, Moultrie, Ga.

The federal bureau of animal industry, the United States Public Health Service, and the federal bureau of entomology and plant quarantine do investigational work on special projects throughout these states.



ANIMAL HOSPITALS IN THE SOUTH

Among the outstanding animal hospitals in the deep south are those of 1) J. M. Bryan, Birmingham, Ala.; 2) S. V. Ramsey, Miami, Fla.; 3) M. K. Heath, Birmingham; 4) W. J. Tanner, St. Petersburg, Fla.; 5) J. H. Yarborough, Miami; 6) J. G. Catlett and E. D. Clawson, Miami; 7) C. E. Bild, Miami; 8) John De Milly, Jr., Tallahassee, Fla.; 9) A. T. Knowles, Miami.

The Control of Rabies*

By J. C. FLYNN, D.V.S.

Kansas City, Mo.

THERE ARE increasing numbers of individuals and of public-spirited papers and magazines who accept the well-demonstrated facts regarding rabies and, consequently, there is a growing number of communities in which the control of rabies has been approached from a sound basis and is proceeding satisfactorily. The experience of these cities, counties and states is encouraging to the extent that one may reasonably hope we may, in the not distant future, speak not only of the control but of the eradication of rabies from this country. Rabies has been eradicated from the British Isles, why not here?

In the interests of furthering the elimination of rabies let us reexamine and restate the known facts regarding the nature of the disease. Let us reevaluate some of the methods of control and sift those which are proved to be effective from those which fail. Let us present the facts as demonstrated in scientific tests, in the practical experience of veterinarians and in the records of public health officials. Let us have the truth of the matter. This should clarify the record, answer the critics, and serve as a new impetus to more effective suppression of rabies. This will also put into concrete form a few facts the busy practicing veterinarian may use to better acquaint his clients with the seriousness of this dreaded disease and the necessity for sane and effective methods of control.

RABIES CONTROL AND THE VETERINARIAN

Rabies control is a public health problem. In some public health matters, such as syphilis, measles, mumps and poliomyelitis, the burden of responsibility falls primarily on the physician. In other diseases, such as tuberculosis, undulant fever, erysipeloid, trichinosis and rabies, the responsibility for control in animals rests on the veteri-

narian, because these diseases are transmitted from animals to man. This is the reason that veterinarians are especially interested in the subject of rabies, avidly follow up all published information on the subject and actively participate in making their own communities safer places for people to live.

Veterinarians have a further interest in this matter. They are college-trained men attracted to the study of the relief of animal disease, and the suppression of the economic loss and suffering from disease among dogs, horses, and those animals whose milk we drink, whose wool we wear, whose eggs or flesh we eat. We instinctively endeavor to protect their well being. Moreover—and we feel we can be forgiven for this—we are reluctant to lose a customer. Each animal which dies unnecessarily, deprives us of a potential patient. Let us put on the record that we care far less about collecting a vaccination fee than about avoiding outbreaks of rabies in our community which might lead to the death of some human beings and of many animals, and the destruction of many more animals which are merely suspected of being rabid. We also are more interested in avoiding the fear which an outbreak of rabies arouses and which causes people either to dispose of their dogs or refrain from procuring them. We as veterinarians, then, not only have a responsibility to control rabies, but also a very definite interest in making it safe for people to own dogs.

ETIOLOGY, TRANSMISSION AND SYMPTOMS

Rabies is a uniformly fatal disease affecting all warm-blooded animals, including man. It primarily affects the nervous system. The mode of transmission places this disease in a class by itself, for transmission is accomplished when the saliva of a rabid animal comes in contact with an open wound of a susceptible animal, usually through the medium of a bite. The dog

*Presented at the 25th annual meeting of the Oklahoma Veterinary Medical Association, Oklahoma City, Okla., January 8-9, 1940.

is the most common offender and is most commonly offended.

The incubation period of rabies varies considerably. The number and severity and the location of the wounds largely control the length of time elapsing between the time of the bite and the development of the disease. In the dog the incubation period in street exposure usually is about three weeks. If the injuries are deep and numerous and located about the face, the chance of escaping infection is remote, and the time of development is shorter than if bitten on the body or extremities.

In the dog the case developed may be of the dumb, furious or semifurious type. The furious type is the most dangerous, as the dog may travel long distances and will attack any person or animal it encounters, especially those which are in motion. In the dumb form the victim usually stays about home with the mouth open, and makes no effort to bite. In the semifurious type the dog has dropping of the jaw but will bite if molested, or at least will attempt to bite, but experiences difficulty in closing the mouth. However, the saliva of one type is equally as virulent as that of the others. It is the furious type that is responsible for the great majority of outbreaks and the continuation of the disease.

A prominent symptom also is the changed voice of the dog. It is more of a hoarse rattle than a bark. The sharp, metallic bark of the Spitz will be changed to resemble that of a Foxhound or Beagle. After the first symptoms appear, the victim may live from 24 hours to seven or eight days. The average duration is about four or five days. The furious types are likely to live longer than the dumb types. Paralysis is a constant symptom and is the immediate cause of death; it may start in the throat or jaw, or in the hind quarters and travel forward. Other symptoms are nervous twitching of the facial muscles, contraction of the iris of one eye, the dark color of the tongue and drooling of saliva.

If we receive a "rush" call to see a dog that the owner declares has just gone suddenly mad, is running, barking, snapping, green-eyed and frothing at the mouth, we

do not become alarmed; these symptoms suggest some other type of disturbance. But if, on the other hand, the client says, "There is something wrong with my dog; he stands around with his mouth open, won't eat, tries to drink and laps water continuously but doesn't seem to get it. This has been going on for about two or three days; his voice has changed and he is getting worse. I think he has a bone in his throat," or, if our client says, "My dog is acting strangely. He bit the postman this morning and killed our cat last night and today he wants to kill a neighbor's chickens and fight his dog with whom he has always been friendly, is nervous, restless and gnaws at the door if we confine him. He was away overnight and just came home yesterday. He was in a fight about three weeks ago and was bitten but we didn't think much about that," we go out fully expecting to see a case of furious rabies, and seldom are we mistaken.

The disease is rare in the cat. I have never witnessed anything other than the furious form in the feline species. Affected cats are furious and will attack people or animals if contacted.

LABORATORY DIAGNOSIS AND PRECAUTIONS

At this point we may briefly mention precautions which should be taken when a case of suspected rabies is encountered. One should always inquire diligently into the history to ascertain how many persons and animals have been exposed, and how severely. The suspected animal should be confined in a safe place until it dies from the disease. This will make more certain the finding of Negri bodies on laboratory examination. If anyone is sufficiently exposed, treatment should be started at once while waiting for final diagnosis. If later it is decided that the dog was not mad, treatment may be discontinued. However, convincing clinical symptoms should be accepted as positive, even though the brain examination may be negative. Negative findings by a laboratory should always be considered as doubtful and may be checked by animal-inoculation tests.

Further, all known exposed animals should be quarantined and given antirabic

treatment and all other dogs of the neighborhood should be quarantined, vaccinated by the use of anti-rabies vaccine and kept on a leash for three months. Stray dogs should be taken up and impounded. This method will stop any outbreak of rabies if carried out effectively.

A COMMUNITY RABIES-CONTROL PROGRAM

We have just dealt with the measures which should be taken when a rabid animal is encountered in a community. This, then, would seem a logical place to present a program which should be followed to prevent the appearance of such an outbreak of rabies. In this we shall list only methods that have been tried and proved to be successful. First, require all owners to register their dogs, giving breed, sex, age, color and markings. This will serve to identify all dogs which have responsible owners and aid in making the further provisions effective. Second, inaugurate a campaign to abandon all unlicensed dogs by picking them up and destroying them. This measure eliminates strays and homeless dogs, which are always a menace in various ways and are commonly the source of a rabies outbreak. Third, require owners to have dogs vaccinated against rabies with not less than 5 cc. of rabies vaccine at least once each year; semiannual vaccination or the use of two injections of 5 cc. each, given at appropriate interval, probably would further increase the effectiveness of vaccination. Fourth, require that all dogs entering a control area be accompanied by a certificate of health stating that rabies vaccine has been administered, not more than 60 days or less than 30 days prior to entry. Where such requirements can not be met, the dog may be admitted and held in quarantine for 90 days, or given antirabic treatment and quarantined for 30 days. If properly conducted, these measures will eliminate rabies from any infested territory. The result is the immunization of all worth while dogs, destruction of all unlicensed and errant dogs.

It is absurd to expect any system at once to be 100 per cent effective. The best plans often have some measure of disappointment. But, if the above plan is followed,

the cries of "mad dog" will be few and far between and the inhuman practice of muzzling dogs and the insane practice of wholesale destruction of dogs will soon be considered as absurd as witchcraft. In areas where systematic vaccination has been enforced, definite results in the suppression of rabies have followed. The time is coming when a person who owns an unvaccinated dog will be considered a public enemy and will be dealt with as such by society.

FAILURE OF THE "MUZZLE AND SHOOT" METHODS

How different, how much more rational and humane is this time-tried program than that which still is followed by some communities. For, unfortunately, public health measures in many places are in the hands of local authorities who lack practical experience. There is nothing that disturbs the community as much as the cry of "mad dog." At first alarm all sane and sound judgment seems to vanish, and panic prevails. As a result, control is attempted by fear-stricken, incompetent, well-meaning but poorly informed law-making and law-enforcing agencies. The first thought is to destroy all dogs and, as a result, thousands of dogs are needlessly killed. This is not only useless but extremely damaging to dog raisers and, incidentally, also to veterinary practice.

No group can successfully cope with any situation without having a fair working knowledge of all angles of the situation. This holds true in the control of rabies. In support of the contention that the public in general lacks knowledge of this disease and its control, one could ask any individual how to control an outbreak of rabies and, unless he is in the small minority, he will tell you to muzzle and shoot all unmuzzled dogs. Why would he say this? Because it is the only method with which he is familiar. If you were to attend a meeting of the city council and say, "Gentlemen, there is eminent danger of a serious outbreak of rabies in your community. What are you going to do about it?" they would answer, "Muzzle and shoot."

Let us weigh this "muzzle and shoot" method of rabies control. In every com-

munity there are stray dogs which constitute the first handicap to this method; the stray dogs roam about unmuzzled. Secondly, it is rare to find an officer who will not turn his back and refuse to shoot just because the dog is not wearing a muzzle. In the third place, no muzzle was ever invented which dogs do not succeed in tearing off and which actually keeps a dog from biting. Finally, there is no way to prevent a stray dog from slipping in from a neighboring community and biting the muzzled dogs. There are enough people in every community who will not comply to insure the complete breakdown of this plan. Although this is the most common method, "muzzle and shoot" always has been a failure.

THE MERITS OF VACCINATION

In the proposed program for the control of rabies, as presented above, there is incorporated a requirement for the vaccination of all dogs in affected communities. This proposal is not new. It is founded on extensive experience. Vaccination has been used extensively as a part of the program of control by private practitioners and as a compulsory measure for the entire community by many cities. And such vaccination has been effective. Speaking from my own experience, as a result of compulsory vaccination in Kansas City, the number of rabid animals appearing in my practice was reduced from an average of 55 annually before compulsory vaccination to an average of five per year after compulsory vaccination.

An impressive volume of scientific literature has appeared showing the favorable results of vaccination against rabies. Some of the articles report the results of vaccination in certain cities of this country. Others report observations made abroad. Some of the reports present the results of laboratory tests of the vaccine. It will be possible to present but a few of these reports, but they are representative.

Birmingham, Ala.—Entering a field wherein rabies was extremely prevalent, October 1934, Birmingham, Ala., gave a marvelous example of the value of the prophylactic use of rabies vaccine. In one year, October 1934 to Sep-

tember 1935, rabies in dogs was reduced 66 per cent, and the number of human treatments required was reduced 67 per cent, although only 78 per cent of the dogs in the city were vaccinated. (*No. Amer. Vet.*, June 1936, p. 42.)

Norris, Tenn.—A serious outbreak of rabies occurred in Norris, Tenn., and by quick control measures, including rabies vaccination, rabies was controlled in that town although the country adjacent had repeated cases that penetrated the city area and constantly exposed vaccinated dogs. "It appears from our two years' experience that prompt treatment by multiple vaccinations will control rabies." (*No. Amer. Vet.*, January 1939, p. 49.)

Nattick, Mass.—In Nattick, Mass., clinics were started about eight years ago. In the first year a mad dog bit seven dogs, six of which were vaccinated and one of which was unvaccinated. The unvaccinated dog died three weeks later. The other six lived. This converted Nattick. (*Jour. A.V.M.A.*, April 1937, p. 500.)

New Brunswick, N. J.—Within a period of twelve days, five cases of rabies were removed from a pack of 250 hounds. The remaining dogs were vaccinated. All quarrelsome dogs were vaccinated with three to five consecutive doses of vaccine. Females were separated in groups of two or three and given one dose of rabies vaccine. All dogs were vaccinated again in six months. This controlled the disease in this pack without further loss. (*Jour. A.V.M.A.*, May 1934, p. 757.)

Kansas City, Mo.—Compulsory vaccination of dogs was introduced in 1927. Rabies had become so prevalent that 305 persons annually were obliged to take antirabic treatment. In the writer's practice, an average of 55 cases of canine rabies per year were being encountered and other veterinarians of Kansas City likewise handled many cases. Figures for 1939 are not yet at hand, but from 1927 to 1938, inclusive, 165,000 dogs were vaccinated under the supervision of the city health department. It is estimated that in the same period local veterinarians vaccinated an additional 35,000 dogs in their private practices. Of course, vaccination did not reach all dogs; some people always try to "get by." And we constantly did have trouble from dogs originating in the outlying suburban districts, over which the city has no control. Thus, Kansas City, Kan., which borders own town on the west, had more than 300 cases of rabies in the last year. And Johnson county, Kan., bordering us on the southwest, lost hundreds of dollars in live stock.

But in spite of the handicaps caused by dogs within the city which were not vaccinated and dogs from surrounding areas, the effects of the vaccination program in Kansas City were remarkable. The number of persons requiring

antirabic treatment has dropped from 305 to 74 annually.

Here is a statement by O. C. Murphy, commissioner of inspection and sanitation in Kansas City, which offers a still more striking picture, since the figures cover vaccinated dogs only:

The prevalence of rabies in this city in 1927 was high. Action was taken by the city council and the compulsory law was enacted. There has been a steady decline of rabies and, today, we have amazingly few, and such cases occur in the outlying districts where the enforcement of the law has failed. We have vaccinated some 135,000 animals and find that less than five breaks have occurred in the vaccinated group. We have had very few cases of paralysis from vaccination. The infirmities of old age and gastrointestinal disturbances of many animals that had been vaccinated were found upon postmortem examination to be the cause of death, rather than paralysis from vaccination.

To any city desiring to control rabies and do an act of human kindness to dumb animals, the vaccination of all dogs is recommended. The experiences of this city disprove any claim of anyone that vaccination is harmful to the animal.

Two interesting reports on the effectiveness of rabies vaccination taken from European and Asiatic sources may be mentioned. Incidentally, may we note that the International Veterinary Congress, composed of highly trained and skilled men who have devoted their lives to the animal side of medicine, endorses rabies vaccination. That they should do so is not surprising, after having made repeated observations of which the following are but samples:

Japan.—In 1918, Japan had 1,041 cases of rabies. In twelve years under prophylactic vaccination, this number was reduced to 60 cases per annum, most of which occurred in unvaccinated dogs. In this period approximately 1,700,000 dogs were vaccinated. In one location in Japan during 1923-24, on account of earthquakes, rabies vaccination was discontinued, resulting in 1,380 rabid dogs. When vaccination was resumed, this number was reduced to 16 per year in the same locality. (*No. Amer. Vet.*, June 1936, p. 50.)

Budapest.—Since vaccination of dogs in Budapest and within a radius of 10 kilometers of Budapest and all Shepherd dogs in Hungary was made compulsory in 1934, the results surpassed all expectation. In fact, 130,000 dogs were vaccinated in three years and not a single

case of rabies developed in Budapest or vicinity, and not a single case in all of the Shepherd dogs in Hungary. (*No. Amer. Vet.*, June 1936, p. 51.)

LABORATORY RESULTS ON VACCINATION

A few experimental projects have been undertaken to test the value of rabies vaccine under laboratory conditions. Rabid animals are dangerous and this probably has served, at least in part, to limit the number of such undertakings.

In some of these experimental tests vaccinated animals were subsequently injected with rabies *virus fixé*, the most active and virulent form of the vaccine that we can induce. Such experiments shed little light on the effectiveness of vaccination in ordinary experience. Your house dog, if bitten, is exposed to "street virus," which is far less drastic.

Some experimenters vaccinated dogs and later injected virus directly into the brain, a vein or the peritoneal cavity. If these dogs did not survive, there still is no evidence that the vaccine is not effective under ordinary circumstances.

One of the most significant laboratory investigations on the effectiveness of rabies vaccine was conducted by Adolph Eichhorn and B. M. Lyon.¹ Note the results on the following groups of dogs:

Nine Dogs.—Six were inoculated with virus 25 days after vaccination; three were inoculated with virus only. All vaccinated dogs lived; all unvaccinated dogs died.

Eleven Dogs.—Eight were given virus three months after vaccination; three were given virus only. One vaccinated dog died of pneumonia; three unvaccinated dogs died of rabies; all others lived.

Ten Dogs.—Seven were given virus seven months after vaccination; three were given virus only. All vaccinated animals lived; all unvaccinated dogs died. During this test one of the control dogs developed furious rabies and was allowed to bite all of the seven vaccinated dogs. This constituted a double exposure and showed the value of vaccination against natural and artificial exposure combined.

Six Dogs.—Four were given virus twelve months following vaccination; two control dogs were given virus. One vaccinated dog died of rabies; both unvaccinated dogs died.

Ten Dogs.—Seven vaccinated dogs were given intraocular injections 22 days after vaccination; three control dogs were similarly inocu-

lated. One vaccinated dog died of rabies; all three unvaccinated dogs died of rabies.

Seven Dogs.—Five vaccinated dogs were given intraocular injections 21 days after vaccination; two unvaccinated dogs were similarly inoculated. One vaccinated animal died of rabies; both unvaccinated dogs died. In this work all diagnoses of rabies were verified by microscopic findings and rabbit inoculations.

SOME MISGUIDED CRITICS

Science always has had its critics. There were those who would not admit that the world is round. There were those who laughed at antiseptic treatment of wounds, who opposed smallpox vaccination, diphtheria vaccination, typhoid vaccine. They always trail the rest of mankind, somehow never managing to catch up with progress.

I should be inclined to place the sentimental but poorly informed writer whose "call of the wild" is carried by so many newspapers and those writers who seem to be imitating him into that class of laggards. This feeble critic is the same "dog expert" who but a few years ago said there is no such disease as rabies. He attempted to pit his judgment against all medical science. Now he is obliged to admit that rabies as a disease exists but argues that rabies vaccine is worthless.

The fulminations of this writer are not without humor. In recent articles he attempts to discredit rabies vaccination of dogs because L. T. Webster of the Rockefeller Institute for Medical Research was unable to protect white mice by means of the vaccine. But we might let such critics in on a secret: As long as we are able to protect dogs, we shall be willing to let them worry about the mice. The limitations of laboratory experiments on this disease have been dealt with in another section. I purposely am not dignifying this writer to the extent of mentioning his name, for he has no scientific standing and his name, in my opinion, therefore has no place in an article devoted to a scientific matter. His writings might indeed be entirely ignored were it not for the fact that he uses such terms as "a smelly matter" and "rabies racket" in speaking about vaccination. And a small but active nondiscriminating section of the press seems to have

been carried away by his empty arguments.

ANSWERING THE CRITICS

The best answer to honest criticism is to avoid giving cause; for malicious criticism there is no answer. For criticism that springs from lack of information, the answer is education.

We can not expect to silence a critic who is well paid for beating his tom-tom. But we can and should present the facts, acquaint our clients with the fundamental nature of rabies, show how it has been and is being controlled in communities which require vaccination of dogs, and in a campaign of education counteract the unnecessary evil which the opponents are promoting. We can and should quote from the record of achievement through rabies vaccination in Kansas City, in Detroit, in Birmingham, in Norris, and in scores of other cities of this country. We should place before our clients the carefully controlled laboratory experiments in which dogs were used as test animals and in which the effectiveness of the vaccine was demonstrated.

We should let the press, the kennel clubs, the humane societies and the general public know that the preponderance of evidence favors the use of rabies vaccine and thus justifies the licensing for manufacture of rabies vaccine by the U. S. bureau of animal industry; that veterinarians directing this branch of our government derive no revenue from the manufacture or use of the vaccine; and that in so far as they give approval to the vaccine, they are but following the precept of that other branch of our government—the highest court in the land.

IMPROVED VACCINES AND VACCINATION METHODS

We should in all fairness also tell the public that our defense of rabies vaccine or of any treatment, for that matter, does not imply a blind state of satisfaction with present achievement. Not at all. In rabies vaccination, for example, we are at present in a number of communities testing the

possible superior merits of intraperitoneal injection as against the widely used subcutaneous administration. We are testing the desirability of a somewhat increased dosage, and of the use of two doses instead of one. Typhoid vaccination, diphtheria toxoid inoculation and other prophylactic treatments are, in fact, more effective where more than one dose is given; why not also rabies vaccination.

Another distinct step toward improved rabies immunization lies in the present efforts of the U. S. bureau of animal industry to establish a uniform, readily practicable test which may be applied to every lot of rabies vaccine before it is sold or used. Present known methods are too cumbersome and expensive to make such testing feasible; the cost of the vaccine would be prohibitive. We hope such a test may soon be available. In the meantime, the biological houses which manufacture the vaccine are resurveying their methods of manufacture, which may also improve the product.

CONCLUSIONS

We have herein presented and discussed:

- 1) The responsibility of the veterinarian for effective rabies control;
- 2) a brief review of the fundamental characteristics of the disease;
- 3) a program for controlling and ultimately eradicating rabies, consisting of a) licensing all dogs, b) eliminating strays, c) vaccinating all dogs, and d) applying necessary quarantine;
- 4) the failure of "muzzle and shoot" rabies-control methods;
- 5) numerous large-scale observations regarding the effectiveness of vaccination in various cities and in the laboratory;
- 6) current unfounded criticisms of vaccination; and
- 7) steps which are being taken to improve the effectiveness of vaccination.

Veterinarians of the United States have controlled and exterminated the Texas fever tick and thus made the southern states important livestock producers. They have stamped out numerous outbreaks of foot-and-mouth disease which threatened

the livestock industry of this country. Step by step they have wiped out bovine tuberculosis until, whereas once from 65 to 85 per cent of all cattle in some communities were affected, now there are by actual test less than 0.5 per cent of tubercular cattle in all but a few remaining counties in this country. This work was opposed, at times by armed resistance from those who, like the opponents of rabies vaccination, are uninformed. Experience shows that it will require a definite campaign of education as well as laws and enforcement to obtain control of rabies.

It is our responsibility to promote the control of rabies as individuals in our own communities. And it is our responsibility to work through our national organization, the American Veterinary Medical Association, to attain this end, to speak out as the well-considered judgment of our officers and of our component membership endorsing a scientific program by the proved methods herein presented in order that the public may be well informed and support that program.

By joint effort, by perseverance, by improving our methods where possible, by vigorous action through ourselves as individuals and through our elected representatives and officers, we shall succeed, and rabies will then cease to be a menace.

Reference

- ¹Eichhorn, A., and Lyon, B. M.: Prophylactic rabies immunization by the one-injection method. *Jour. A.V.M.A.*, lxiiv (1924), n. s. 17 (6), pp. 690-696.

Volt, the unit of electromotive force, was named for Guiseppe Antonio Anastasio Volta (1745-1827), famous Italian physicist, who astonished the world when (1775) he produced the first stream of electric sparks from a chemical battery.

The microbic cause of septicemia was discovered by Robert Koch in 1878, although in 1866 Coze and Feltz produced septicemia in rabbits by injecting putrid substances into their circulation, and were able to detect the presence of bacteria in their blood.

Veterinary Practice in the Bahama Islands

By J. N. BROWN, D.V.M.

Dallas, Texas

THE BAHAMA ISLANDS, located in the Atlantic Ocean approximately 200 miles off the coast of Florida, are controlled by Great Britain. Nassau, on the island of New Providence, is the capital and has a population of about 30,000. It is noted as a winter resort, and the height of the tourist season is reached during the month of February. At this time the veterinarian's practice is confined essentially to the treatment of dogs owned by the visitors. At other times the practice is confined to native animals and pets. A very small percentage of the income is derived from the native practice because most of the large animals are owned by the colored population, a great part of which can not afford professional service. Of course, race-track and polo horses add to the income during the tourist season.

Native horses are used principally for two purposes—dray and carriage. Malnutrition and injuries are their most common ailments. The rations they receive are barely adequate, and due to the rocky topography of the island, there is practically no place for them to graze. All grains are imported and oats usually are fed as the only concentrate. Corn is not fed because of a superstition among the natives that horses fed corn will not work well, and become mean. The bulk is obtained from guinea grass sold as blades by the natives, who cut and bundle it for one penny (2 cents). Minerals are never added. This diet along with a heavy infestation of parasites keeps the animals in a very poor condition. In less than a year over a dozen horses collapsed, some in harness, and because they were too weak to recover, it was necessary to destroy them.

Within the past few years, the humane society, aided by the police, has done much to remedy this condition, but as long as the poorer class of colored natives are allowed to have animals, this situation will never be completely remedied.

Fortunately, very few infectious diseases are present. In horses an occasional case of tetanus is seen, and over a period of two years only two cases of strangles have been diagnosed. The animals with tetanus are destroyed and burned as soon as a definite diagnosis is made because, with the exception of polo horses, none is valuable enough to justify the cost of treatment. All valuable animals are kept immunized with the toxoid.

In all diseases the older natives have their own ideas as to the cause and method of treatment, and it will be some time before they are educated otherwise.

Four dairies, totaling about 200 milk cows, supply the island with milk, at a cost to the consumer of one shilling and four pence (approximately 32 cents) a quart. These animals are fairly well kept. All foods, with the exception of a small amount of grazing, are imported, either from the adjacent islands or the United States. The roughage fed is either citrus or beet pulp.

As with horses, infectious diseases in cattle are not common. In a test for tuberculosis only one affected animal was found. Three recently imported animals reacted to the agglutination test for Bang's disease. Occasionally, a case of tick fever occurs in cattle imported from a tick-free area. Native cattle seem to possess a high degree of immunity.

Rigid inspection is maintained by the health department on all live stock, especially imported cattle. All health certificates must be dated within a certain time limit, signed by a competent veterinarian, and written in English.

Not long ago a certain dairy farm in the United States made a contract with some butchers for about 20 head of cattle. The cattle were shipped, but upon arrival at Nassau were held in port because their health certificates were not in order. After investigation it was found that the cattle

were reactors to Bang's disease. They were immediately disposed of at sea.

Ticks are quite a problem. All cattle are dipped as often as possible, and are hand picked between dippings. Recently, a winter resident imported eight Cuban bulls to put on pasture. Shortly after they arrived, he instructed a layman to dip or spray the bulls for ticks. The layman purchased a commercial spray containing phenol and, through a mistake in mixing the spray, made the solution too strong. The next day two of the animals were dead, and before I could reach the premises, all were dead. Similar things frequently happen because of the ignorance of the natives as to the care of live stock.

The dogs of the natives also suffer from malnutrition. Blacktongue occurs frequently, as well as many other deficiency diseases. Generally, the dietary of a native dog consists of hominy, grits and rice and, occasionally, fish. Only about 50 per cent of the puppies reach maturity. Distemper takes its toll of dogs, as the average case is treated by the owner until it is almost dead. The main prevention and treatment used by the owners is the application of coal tar over the base of the head.

Heartworms constitute a major problem. Every adult dog that remains out of doors is infested and seldom lives to 4 years of age. Affected dogs show the typical symptoms of ascites, anemia and emaciation before dying. The natives also have a unique method of treating this disease. They either chew or soak in water about 1 oz. of chewing tobacco and, when it is well saturated, it is forced down the dog. Needless to say, the results are negligible.

Sheep, goats, swine and poultry also are raised in the Bahamas. The sheep are of hearty breed. They live on whatever grazing is available and receive little attention. They are never sheared and usually shed in the spring. The highest mortality in sheep and goats is the result of dog bites and injuries.

Swine and poultry receive little care. Swine are very resistant and suffer more from parasitism than any other condition.

In the abattoir 50 per cent of the lungs contain lung worms, 10 per cent show kidney worms and about 3 per cent of the carcasses are condemned because of measles. Poultry suffer mainly from malnutrition. They are subject to more infectious diseases than the other animals, the most prevalent of these being fowl pox. The natives call this "Pip" and treat it by removing the crust as soon as it forms. Only the native fowls survive for any great length of time. Several wealthy men have tried at different times to raise poultry commercially, but each has failed and suffered a heavy financial loss.

For an interesting and varied practice one need look no further than the Bahama Islands.

Rats Not Carriers of Rabies Virus

An investigation conducted in Birmingham, Ala., recently, has revealed that rats do not harbor canine rabies virus and, therefore, do not play a part in the transmission of the infection. This report is of particular interest because Birmingham has had a relatively high incidence of rabies for a number of years. (*George A. Denison and Charles N. Leach. Incidence of Rabies in Dogs and Rats as Determined by Survey. American Journal of Public Health, xxx, March 1940, pp. 267-269.*)

The saliva test has eliminated most of the vicious-drugging practices in racing circles. . . . In experimentally "doped" horses, the presence of the drug could be detected in every instance when given orally and in some instances after hypodermic administration. . . . The urine test proved of value in practically every instance even when doses as minute as one tenth of a grain were given.—*Catlett.*

Although the control of contagious abortion is essential to successful dairying, it can not be stamped out until the basic causes of genital diseases are better understood.—*W. L. Williams.*

EDITORIAL

Honesty sometimes keeps a man from growing rich, and civility from being witty.—J. Selden.

Veterinary Licensure

THROUGH EXCELLENT coöperation on the part of the secretaries of the state associations located in zone 3,* it has been possible to obtain a considerable amount of information relative to the licensure of veterinarians, the quack situation and other pertinent data. The executive office is making an intensive investigation of the legislative problem for the purpose of obtaining a true picture of the situation and, moreover, to study the problem so that constructive efforts may be put forth to aid the membership in combating the practice evils rampant throughout the country.

Alabama.—The veterinary examining board consists of five members. They must be members of the state association and are appointed by the governor for a period of five years. Applicants for a license must pay a fee of \$10.00 at the time of the examination and an annual registration fee of \$1.00 thereafter. To be eligible to take the veterinary board examination, the applicant must be a graduate of a legally chartered school.

The Alabama practice act exempts persons gratuitously treating animals in cases of emergency in localities where a registered or licensed veterinarian is not available, and it does not prevent persons in rural districts and small towns from operating upon or prescribing for animals where veterinarians are not available. This act does not prevent such persons from castrating, spaying or dehorning domestic animals. However, it does prevent such persons from using any title appertaining to the practice

of veterinary medicine and surgery. Properly instructed official county, state and federal farm demonstrators and other qualified persons are not prevented from administering hog-cholera serum. It is believed that quackery is on the decline and that it will continue to decline as recent graduates locate in areas not previously provided with properly trained veterinarians.

Arkansas.—The licensed non-graduates (75) far outnumber the graduates in the state. Just recently, 26 non-graduates were licensed after certifying that they had practiced for at least two years prior to June 15, 1915. At the same time, a recent graduate was required to answer 18 typewritten pages of questions before being issued a license. The veterinary examining board consists of three members selected by the governor for a period of two years. The examination fee is \$10.00 and no annual registration is required.

Florida.—The present Florida veterinary practice act became a law on June 8, 1925. It provides that no person other than a licensed veterinarian may practice veterinary medicine and surgery in any of its branches, including dentistry, excepting castration and spaying of animals and dehorning of cattle, beginning six months after June 8, 1925. All non-graduates who were able to prove that they were engaged in actual practice prior to April 1, 1925, were issued licenses. Only nine licensed non-graduates are active at the present time in the state.

All applicants to be eligible for the Florida board examination must submit proof of graduation from a college of veterinary medicine recognized by the A.V.M.A. Since no provision is made for the issuance of

*Zone 3, under the Association's convention-area plan, comprises Oklahoma, Texas, Arkansas, Louisiana, Tennessee, Mississippi, Alabama, Georgia, South Carolina, North Carolina and Florida.

licenses except to those who pass the state board examination, non-graduates are now eliminated. An examination fee of \$10.00 is required of all applicants and there is a renewal fee of \$1.00 each year. The board of veterinary examiners is composed of three members appointed by the governor. Not more than two of the members may be graduates of the same college, and the term of office is six years.

Georgia.—There is only one licensed non-graduate practicing in the state. This license was issued in accordance with the practice act of 1908. Certain sections of the state, particularly the northern one third, will not support graduates, and here illegal practitioners are common. Of course, quacks are found in all parts of the state and it is practically impossible to obtain a favorable verdict when such individuals are brought into court.

Anyone may take the state board examination by paying the necessary fee. However, no layman has ever passed the examination, though many have tried. The examination fee is \$10.00 and all persons possessing proof of graduation from a recognized school are granted a license without examination. The applicant must be of good moral character and have established residence in the state. There is no annual registration fee. The state board consists of five members who are endorsed by the state association and appointed by the governor with the approval of the state senate.

Louisiana.—Anyone may take the examination by making application and paying the fee of \$10.00. Only graduates have been successful in passing the examination. Annual registration is not required. The veterinary examining board is selected as follows: The state association selects eight candidates by ballot and the governor, in turn, appoints four for a term of four years. Apparently, the quack situation is not troublesome, since only a few endeavor to do vaccination work, worming, etc. There are two licensed non-graduates practicing in the state at this time.

Mississippi.—A fee of \$10.00 is required at the time an application is made for a

license. Anyone may take the examination. Annual registration is not required. If the applicant is a graduate of a recognized veterinary college, he is not required to take an examination. Seventy-seven licensed non-graduates are practicing in the state. The quack situation is not very encouraging. Numerous county agents also are attempting to do veterinary work. Moreover, there are a rather large number of quacks operating outside the law who apparently have considerable political influence. The board of veterinary examiners consists of five members who are appointed by the governor for a term of four years.

North Carolina.—Six licensed non-graduates reside in the state at the present time. Part of them were licensed by the board and the remainder by an act of the legislature. At the present time only graduate veterinarians may take the examination. The examination fee is \$25.00 and annual registration is required. The board of examiners consists of five members who are nominated by the state association and appointed for a term of five years by the governor. It is estimated that North Carolina has at least 25 active quacks and a great many more do some veterinary work. In addition, there are five county agents and their assistants along with 15 to 30 teachers of agriculture who devote considerable time to veterinary activities.

Oklahoma.—The state has 130 registered licensed graduates and 88 licensed non-graduates. The number of non-graduates is decreasing quite rapidly. Anyone may take the examination upon the payment of a fee of \$15.00. The board may choose to recognize the license issued by another state upon the payment of a fee of \$25.00. All licensed veterinarians in the state must pay an annual registration fee of \$3.00. The board of veterinary medical examiners consists of five members appointed by the governor with the advice and consent of the state senate.

In regard to quacks, the Oklahoma board has recently sent letters to 180 violators of the practice act. A second letter was mailed to 46 and a third to 17. Fifteen non-graduates took the examination and all but two

failed. One non-graduate was issued a license in accordance with the 1913 practice act. Three have left the state as a result of the board's activities. Two others have been convicted and one case was lost.

South Carolina.—Fifty-five licensed graduates and 17 licensed non-graduates are registered in the state. Apparently, the quack is fast fading out of the picture. The examination fee is \$10.00. The examining board consists of three members nominated by the state association and appointed by the governor for one-, two- and three-year terms, respectively.

Every person holding a license to practice must pay an annual registration fee of \$4.00. A temporary license may be issued to a graduate of a recognized veterinary college upon the payment of a fee of \$5.00 to practice until the next regular meeting of the examining board.

Tennessee.—Quacks are quite plentiful in Tennessee. There are also 20 licensed non-graduates attempting to practice in the state. Graduates of recognized veterinary colleges are required to pay \$5.00 for a license and an examination is not required. Others are required to pay a \$10.00 examination fee and must pass a written examination in eight subjects before being licensed to practice. There is no annual registration of licensed veterinarians. The veterinary examining board consists of four members appointed for a term of four years by the governor.

Texas.—At the present time there are 60 licensed non-graduates in the state. These men were licensed under the law of 1911, and 1919 was the last year such licenses were granted. Altogether there are approximately 762 empirics in the state. The number of graduates is about 400. Only graduates of veterinary schools approved by the A.V.M.A. and the B.A.I. are permitted to take the state board examination. A fee of \$15.00 is charged at the time of the examination and the annual registration fee is \$1.00. The examining board consists of seven members appointed by the governor. Reappointments or new appointments are made the first part of each year.

The state association through a contact

committee is endeavoring to curb the activities of the many quacks in the state. It has been estimated that unqualified practitioners cost the state of Texas \$2,286,000 annually. In August of 1939, a full-time special investigator was employed to assist the committee in this work. Within a period of five months 75 of the most active quacks were contacted. Thus far, about 25 per cent have ceased to practice, a similar percentage have ignored the warning, and the remaining 50 per cent are men over 50 years of age. This last group realize the strength of the Texas law and have curbed their activities considerably.

In general the legal protection offered by state veterinary practice acts is negligible. This, in a measure, is due to the fact that most of the acts are antiquated and have not been brought up to date. The majority of them were written in the days when horses represented the major activity of the profession. Most of the acts provide for the licensing of non-graduates who were engaged in veterinary activities prior to certain specified dates. Age has largely eliminated the licensed non-graduate but in his place has come the *bona fide* quack who openly defies the law in many of the states.

Unfortunately, the funds available to the veterinary examining boards who, for the most part, are charged with the responsibility of enforcing practice acts, are inadequate. Further, we are brought face to face with the ever-present problem of acquainting the public with the importance of a competent veterinary personnel. This is often the basis for the opposition the profession meets when new legislation to better our cause is attempted. We are fighting the same ignorance the medical profession fought years ago. It is apparent that this situation can be remedied only if adequate appropriations are made for gathering evidence and prosecuting charlatans, and if the public is educated to the benefits to be derived by employing properly qualified veterinarians. However, we must never forget that the most damaging quack of all is the graduate quack.

A Program of Public Education to Serve the Interests of Veterinary Medicine

THE YEAR 1940 marks a noticeable increase in the amount of editorial space that is being devoted in national magazines to animal subjects. In some instances qualified veterinarians are writing about the selection and care of pets. In many other instances pet owners and breeders are reporting their experiences. A publisher of large-selling periodicals has just issued a new 25-cent magazine, *Popular Pets*, which is devoted entirely to animal stories. These articles and publications are prepared for profit, and items of veterinary interest are included because there is an active public demand for them.

From the standpoint of veterinary medicine, this awakened public interest in animal care presents both advantages and dangers. It may be said that any publicity which increases public consciousness of man's responsibility to his pets and the rôle of veterinary medicine in safeguarding the health of animals, is advantageous. Unfortunately, the profit motive is often blind and generates publicity which operates against the best interests both of the public and the professions which serve it. This has been the experience in the field of human medicine and there is no reason to suppose that it will be different in the case of veterinary medicine. The only practical answer to this situation is to introduce a factor of control—an organ of publicity which is directly controlled at all points by the American Veterinary Medical Association.

A proposal for such an organ of controlled publicity, in the form of a self-supporting monthly magazine edited for the general public, was developed by the Committee on Public Relations and submitted to the Executive Board during 1939. The plan attracted much favorable comment among the officers of the Association, and a decision concerning it is now being approached. In this and several succeeding articles there will be presented aspects of the plan of interest to Association members.

The first question to be asked of such a magazine is, "Has the public a sufficient interest in the facts about animal care to assure an active and responsive reading audience?" This question answers itself in terms of the large amount of editorial space which general magazines are now devoting to animal articles. Their only motive is that the public demands articles of this type, and they profit from the demand. It also should be noted that their editorial policy is subject to bias in order to satisfy advertisers of patent preparations for animal care.

Granting public interest in the broad subject of animal care, the field is open for an authoritative satisfaction of this interest by a magazine which translates the ideals, experience and interests of the veterinary profession into terms that the public can understand and enjoy. Such a magazine can strike an efficient editorial balance between the interests of veterinary medicine as a whole and the interests of the individual veterinarian. This would be done, according to the plan now under consideration, in the following ways:

- 1) Each issue would contain one article dealing with the importance of veterinary medicine and the veterinary profession in the modern social scene. In this way, the public would be educated to a greater appreciation of, and respect for, the function of the veterinarian.

- 2) Each issue would maintain an editorial balance between articles dealing with the care of domestic animals, pets and wild life. In each case, the rôle of the individual veterinarian would be explained and clarified, and the demand for veterinary services would be stimulated.

- 3) The magazine would be sponsored, controlled and circulated by the Association, but it would be distributed to mailing lists provided by local associations and individual members. That is, each issue would reach the recipient with the compliments of the local association or the veterinarian who

furnished the reader's name. In this way, it would promote the interests of the national association, of local associations, and of individual members who wish to participate.

4) The physical and editorial quality of the magazine would be such that the recipient's appreciation would be assured. However, the cost of distributing the magazine to one reader for one year would be small so that an individual member could easily afford to underwrite 20 or more subscriptions to his clientele. This participation should pay a direct return to the member in client goodwill, and he would aid in producing broader benefits to the Association and the cause of veterinary medicine. Circulation would, of course, be restricted to members.

5) Over a period of time the organ would provide a source of authoritative articles on various aspects of veterinary medicine that could be reprinted by general magazines and newspapers, thus assuring ethical representation in the nation's press.

Members who are interested in the proposal are invited to write to the JOURNAL, offering comments and questions concerning these tentative plans.

Texts for Speeches

"THE JOURNAL has frequently remarked that the public is not well enough informed on the importance of veterinary medicine," says a letter asking for themes appropriate for talks before civic clubs and other groups when veterinarians are invited to tell the story of their occupation to local gatherings.

In this important *métier*, there seems to be nothing requiring public attention more than the often-told contention that the march of mankind runs parallel to the supply of food and other commodities of domestic animal origin. Populations increase in number and achievement only as fast as domestic animal products flow into the marts of trade. The flow must be steady, sufficient and dependable. The slightest interruption of this service of supply is immediately reflected by a corresponding up-

set of general welfare. This topic alone should be a good text for a speech in any company.

More graphic, perhaps, is the unassailable fact that the progress of mankind since veterinary services were established in the 18th century has been constant and rapid. Advancement of the right sort since then has been many times greater than man was able to make during the preceding centuries of known history. In other words, in two centuries of veterinary services, civilization made more progress in the liberal arts and basic sciences than during the 50 centuries before systematic prevention of animal diseases was established. Until then, advancement often was halted or set back through the uncertainties of nourishment for man and his animals. One can always point out without fear of exaggerating that the material possessions man now enjoys could not have been obtained but for the control of anthrax, blackleg, rinderpest, sheep pox, hog cholera, piroplasmosis, and provincial animal plagues too numerous to mention. Were these to be permitted to flare through momentary suspension of the veterinary service, the march of man would stop. Chaos, poverty, undernourishment, famine and pestilence would be the price nations would pay for failing to support the buttress of progress furnished by the veterinary profession as it is now organized.

The humane side of veterinary science also can be invoked before serious-minded groups. Large-scale prevention of disease is large-scale prevention of cruelty to animals and the merciful treatment of the sick and injured as practiced by modern veterinarians is not mere trumpetry. In having replaced the charlatanism of the past with modern medicine, veterinarians suppress a great deal of suffering and conserve a great deal of property.

The training of young men on the inspection of food by the veterinary colleges, which takes practical form in the abattoirs furnishing the bulk of the food we eat, and the gradual development of a comprehensive system of milk supervision are matters of current community interest that make good

Animal Production a Branch of Veterinary Science

THOUGH IT IS now common knowledge that the creation of a new mammal begins by the laying of an egg in the oviduct and its subsequent fertilization by the sperm of the male, the mechanism and processes by which the espousal is accomplished were by no means well understood until comparatively recent years.

While de Graaf (1672) identified the ovary as the source of the ovum, he did not connect its uterine development with the action of the male sperm, which Van Leeuwenhock, a few years later (1677), found to be the carrier of myriads of wiggling bodies. To the earlier biologists of the Aristotle - Plato - Socrates - Hippocrates world, the early steps of reproduction were a profound mystery—the subject of heated controversy. The menstrual blood fed by the male sperm was the stimulating factor of fetal growth. The female formed the fetus and the male gave it life, animation and a soul, these early apostles of science and philosophy contended. Even Galen, famed physician of the gladiators, 500 years later taught that the male semen mixed with the menstrual blood gave birth to the embryo. His teachings did not recognize the ovum, yet they lasted through twelve centuries—as a matter of fact, until 1604, when Fabricius identified the ovary as the source of the ovum.

Through all of these centuries the respective rôles of the spermatozoon and ovum were not known. As one historian tells it, there was a royal battle between the "spermists" and the "ovists." While both of these groups acknowledged the presence of the two sexual germ cells, the one belit-

tled the part played by the hobby of the other. Some of the ovists taught that the semen was loaded with parasitic worms and played no part in the reproductive process, even as the modern school of medicine was aborning. As late as the 16th century the English law contended that the mother contributed nothing to the development of the fetus. In 1545, the wife of the Duke of Suffolk was denied the right to claim that she had any relation to her own son, except to serve as the incubator for the Duke's animating issue.

In 1827, Von Baer isolated unfertilized ova for the first time and again proved the ovary as its source. In 1851, Newport proved that the spermatozoon is the fertilizing agent, and its union with the ovum the starting point of the new being. Until then, the process of reproduction was clouded by a haze of mystery. Since then, research could go ahead with the fine details which gave birth to the revealing study of genetics and to the knowledge which has transformed animal production into a classical branch of science comprising anatomy, physiology, pathology, surgery, obstetrics, specialized dietetics, zoötechnics, therapeutics and the revived art of artificial insemination.

Since mammalian reproduction as a study is the integration of these sciences, and since the mysteries of the past have been removed, domestic animal production will become more and more inseparably dovetailed into the practice of veterinary medicine. There would be little wisdom in leaving the source of animals in the hands of the untrained, and it certainly will not take that detour if we do not slumber now as we have done on several occasions of the past when new projects in animal industry were coming into the landscape.

Chenn Nung, Emperor of China about 3000 B. C., has been called the father of galenical therapeutics. He was the first to study the medicinal value of plants and to classify their virtues.

(Continued from preceding page)

topics for speeches. But, back of all this, the farmers, the agricultural colleges, the processors of animal foods, and the veterinary profession have yet to impress the public that in domestic animals lies the only means of sustaining the present population of the world. Respect and support of the profession must be built upon that theme.

WITH THE EDITORS

VETERINARIANS of the southern states—the deep South, the Southeast and the Southwest: This, the Southern States Issue, is dedicated to you.

In speaking of the "southern states" we refer to the commonwealths of the area designated as Zone 3* in the Association's administrative by-laws (see page 751, December 1939 issue). Those who have studied this new document will recall that the United States and Canada have been divided into four zones where conventions will be held in regular order. Thus, in carrying out the plan of dedicating issues of the JOURNAL to geographic areas, it was deemed advisable to follow this zoning arrangement. The terms "southern," "eastern," "western" and "central" are too indefinite for this particular purpose, a part of which is to gather important data needed to guide the nationwide promotional work of the Association. This explains why Virginia, Maryland and Kentucky are not included among the states given special mention.

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Most of the literary contributions in this issue were either prepared by southern veterinarians or presented at meetings in Zone 3. Of particular interest is the leading article, "Veterinary Services in the South," by Secretary of Agriculture Wallace. To gain an insight into the livestock situation in the South we suggest reading the articles by John R. Mohler, M. Jacob, A. L. Shealy and M. W. Emmel. If you desire to really "go southern," read, "Mule Practice in the Sugar Cane Belt," by J. Arthur Goodwin of Louisiana. Don't forget that there are approximately 4,300,000 mules in this country.

*Zone 3 comprises Oklahoma, Texas, Arkansas, Louisiana, Tennessee, Mississippi, Alabama, Florida, Georgia, South Carolina and North Carolina.

Two practical points are contained in Charles C. Rife's article on hospital management which will reward the reader who is engaged in small animal practice.

Neoplasms of the mammary gland in dogs are ably discussed by Carl F. Schlottbauer. The full-page plate which illustrates the lymph drainage of the mammary glands is worthy of study. If one wishes to approach the surgical treatment of mammary tumors in an intelligent manner, the information contained in the aforementioned diagram is essential.

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A new stallion and jack semen collector is described by V. R. Berliner of Mississippi.

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The wealth of well-grounded information contained in the article entitled, "Cattle Practice," by E. R. Cushing of New Jersey, which was presented at the Southern Veterinary Medical Association meeting in Columbia, S. Car., last fall, will give the practitioner an idea or two, whether he lives in Maine or California.

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James R. Ketchersid of Texas reports good results with sulfapyridine in pneumonia in dogs. He recommends an initial daily dose of 1 gr. per pound of body weight. It is suggested that this amount be reduced 50 per cent each succeeding 24 hours. His clinical observations indicate that a streptococcus is the predominating pathogen.

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Attention is called to a new disease caused by those dangerous clay pigeons and, specifically, to C. H. Case's report on "Lead and Coal-Tar-Pitch Poisoning in Cattle." Curiously enough, Dr. Case observed the same liver lesions in one cow as described by Graham and his coworkers in pigs. (Jour. A.V.M.A., February 1940).

Prepare to Visit the National Capital in August

CLINICAL DATA

Encephalitis of Dogs*

By D. M. HOWARD, D.V.M.

Augusta, Ga.

IN MY PRACTICE I have come in contact with a disease condition of dogs which in the beginning was baffling, and it still is to a great extent. The reason for this is that all cases appear somewhat alike but the clinical symptoms and history vary considerably. This often makes a positive diagnosis rather difficult. Some of the cases simulate distemper, while others are suggestive of infectious enteritis. A hacking cough and a dull, drowsy appearance are common. In other cases one wonders just what could be wrong.

CLASSIFICATION OF SYMPTOMS

I have classified the symptoms under four types, although the symptoms may overlap. Paralysis of the hind quarters, partial or complete, or a lameness in any of the legs may be observed in all four types.

Type 1.—This covers most of the cases that were among the first to be observed by the writer. The eyes are filled with pus, a nasal discharge is present, the respirations are normal, the pulse is slightly accelerated, there is a putrid odor to the breath, a bloody, frothy diarrhea, and the temperatures range from 101.5° to 103.5° F. Some of the patients eat fairly well, others refuse all food, and many vomit frequently. All of the cases present the appearance of being very sick and weak.

In this group the course is very rapid and, if not checked in 48 hours, death is the usual result. A few dogs in this group did not exhibit a discharge from the eyes or nose. A history of being in a run-down

condition for a week preceding presentation is very common. Those cases that hang on, so to speak, showing improvement one day and slipping back the next, go into convulsions in the course of a few days to two or three weeks and succumb seven to ten days afterward.

On autopsy a bloody froth was found in the trachea. There were hemorrhages throughout the lungs which varied from pinpoint to pea size; small petechial hemorrhages on the heart; a bluish hemorrhagic condition of the stomach and intestine; a pale, yellowish liver; a shortened, thickened spleen which was occasionally studded with ulcers; and disintegration of the pancreas. As a rule, the kidneys were very firm. In those cases that had convulsions, an excessive amount of cerebral fluid was common.

Type 2.—In this group the appetite is intermittent and there is sneezing, coughing and, generally, a watery discharge from the eyes and nose. The rales in the lungs are suggestive of bronchitis. The action of the bowels will vary from normal to a slight looseness, but in most cases constipation associated with a catarrhal enteritis is observed. The temperature will range from 101° to 103° F. If the patient does not go into convulsions, cases of this type will usually respond in two or three weeks.

The postmortem lesions are the same as those observed in cases of type 1, except that the gastrointestinal tract is usually normal in those which have shown a temporary response to treatment, even though death ensued.

Type 3.—There is an extreme loss of weight despite a normal appetite. A foul,

*Presented at the annual meeting of the Southern Veterinary Medical Association, Columbia, S. Car., November 9-11, 1939.

putrid diarrhea which is blood-stained at times is common. A slight cough, rales and temperatures ranging from 100° to 102° F. are likewise common. Cases of this group, during the later stages, develop marked nervous symptoms: Champing of the jaws and crying as though in pain or barking continually and even screaming. The cry is more of a whimper. The postmortem findings are the same as those for types 1 and 2.

Type 4.—Here, there is a history of running and barking fits. The temperature will vary from 101° to 108° F., depending upon the interval since the last fit. The appetite is usually poor, vomition is common and the vomitus is usually green. Apparently, intestinal parasites are not a factor. The diet will vary from good to inadequate. The bowels are usually loose. Some of the cases exhibit a hacking cough and a number of them have a series of convulsions, one right after another. Those which make a rapid recovery in three to four days usually remain well. Those which respond slowly at first often relapse in about ten days and death usually follows. On autopsy the findings correspond to type 2.

CASE 1 (TYPE 1)

Case 1 was a 65-lb. field trial pointer with a history of anorexia and a bloody diarrhea of two day standing. The diarrhea was frothy, stained with blood and very watery. Vomiting was common, all food was refused, and the patient was very dehydrated. However, the dog would take water. The temperature was 102° F. and a slight cough was present, but the eyes and nose were normal. The specific gravity of the urine was 1115 and the urine was of a slightly orange color. Following the administration of methenamin, 5 gr. three times a day, the specific gravity dropped within 24 hours and the color approached the normal. In another 24 hours the patient was dead. The lesions observed on autopsy coincided with those described in the type 1 group.

CASE 2 (TYPE 1)

Case 2 was a 6-month-old German Shepherd that was kept in the country. He

chased rabbits and was also fed table scraps. There was a history of vomiting and a rapid loss of weight. The nose and eyes were normal and the temperature was 102° F. The dog was slightly dehydrated and a putrid, blood-tinged diarrhea was present. On palpation the intestine appeared to be swollen. The urine was normal. The patient was subjected to a gastrointestinal lavage and in 24 hours he was eating again and appeared to be responding nicely. However, the vomiting and diarrhea started again. Another lavage was given and again the dog appeared to respond, only to have the diarrhea and vomiting reappear. This was repeated several times. No particular line of treatment appeared to be of benefit. Each time the vomiting and diarrhea set in, the patient lost more ground. During the fifth week of treatment, convulsions started and continued for a week before death intervened. On autopsy petechial hemorrhages were observed on the heart and lungs, the pancreas exhibited evidence of degeneration, the liver was anemic, the stomach, intestine and kidneys were normal, and the spleen atrophic. This puppy did not at any time have a temperature over 102.5° F. and, in my opinion, did not manifest symptoms suggestive of canine distemper.

CASE 3 (TYPE 2)

Case 3 was a 1-year-old Boston Terrier weighing 17 lbs. This dog was running in a yard with six other Bostons. None of them had received preventive treatment against distemper. The patient in question first started to sneeze, then a hacking cough which became aggravated at night developed. A slight, watery discharge from the nose and eyes was present. In general, the patient was very depressed and had no desire for food. He would eat a little when tempted.

When presented to the writer for examination, the dog had been sick one week. At this time the temperature was 103° F., definite rales were present, and the breathing was deep and more or less of the abdominal type. The stools were very soft. The owner refused to hospitalize the dog and,

therefore, it was necessary to bring him to the office each day. Finally, I prevailed upon the owner to leave the dog in the hospital for a week and at the end of that time the patient was sent home, well on the road to recovery. None of the other dogs contracted the malady.

The treatment consisted of the application of a pneumonia jacket, camphorated oil to support the heart, and sulfanilamide, 15 gr. three times a day. This dosage was later reduced to 10 gr. twice a day. Cod liver oil emulsion and a tonic containing nux vomica also were administered to the patient.

CASE 4 (TYPE 3)

Case 4 was a male Boston Terrier running with his mother, who was a year older, and a Spitz the same age as he. The owner reported that the dog had been sick for two days. He refused food, the eyes and nose were matted with pus, and he cried with pain. He had frequent convulsions, one following another, and a bloody froth emanated from the throat. The temperature was 107° F. Dehydration was very noticeable. Sulfanilamide, the aforementioned tonic and cod liver oil were administered by means of a stomach tube and a sufficient amount of nembutal was given to effect a profound sleep for twelve hours. It was necessary to elevate the hind quarters to establish drainage from the mouth. This fluid was coming from the trachea. It was brown and flecked with blood. After the effects of the anesthesia had worn off, the patient was given another gastrointestinal lavage and a sufficient amount of nembutal to maintain profound sleep for another twelve hours.

At the end of 36 hours the temperature was 101.5° F. and it did not vary thereafter throughout the course of treatment. At the end of the week the dog was sent home and has been doing splendidly since that time. The mother of the patient appeared to be a little dull and depressed at the time I picked up the sick male. Therefore, I dispensed a sufficient amount of the cod liver oil emulsion for a two-day treatment. She responded with no additional therapy. The Spitz remained healthy.

CASE 5 (TYPE 4)

Case 5 was a 6-year-old German Shepherd which had been suffering with running fits for two days. The subject was having five to eight fits a day and was extremely nervous at all times. One half of the ration consisted of beef and the remainder of vegetables and milk. The temperature was 101° F., the bowels were loose, and the excreta had the usual foul odor. The intestine appeared to be swollen. A watery discharge from the eyes and nose was present. The breath had a putrid odor. Cod liver oil emulsion and kaopectate were administered and, in addition, sufficient nembutal to relax the patient for twelve hours. The dog returned to normal in three days.

SUMMARY

Many of these cases simulate canine distemper but I have not found this condition to be contagious. The line of treatment I usually employ in combating canine distemper is without value in the treatment of these cases, and I might mention that my results in the treatment of distemper have been highly gratifying.

Multiple Osteogenic Growths

"A German Shepherd, 12 months old, raised in the open where there was plenty of sunlight and maintained on a mixed ration that should certainly have prevented rickets, is affected with bony enlargements of the carpus, tarsus and several of the interphalangeal articulations. This dog was never in pain as cases of rickets are, and has been treated with good antirachitic treatment since he was a pup. What, if anything, can be done to reduce these enlargements, and what is the nature of such a trouble?"—*F. W. C., Illinois.*

Reply.—In addition to rickets and the osteoperiostitis reflecting the presence of organic tuberculosis (rare in this country), dogs suffer from multiple osseous growths of unknown nature which start at the diaphyso-epiphyseal conjugations of the young and grow throughout the period of adolescence, whereupon they remain station-

Clinical Studies of Sulfapyridine in Small Animal Practice*

By JAMES R. KETCHERSID, B.S., D.V.M.

College Station, Texas

EARLY in the spring of 1939, many medical journals were publishing reports of a new drug, sulfapyridine, that can be used as a chemotherapeutic agent in treating pneumococcal pneumonia. The drug had been used experimentally on clinical cases for six months prior to that time.

Sulfapyridine is closely related to sulfanilamide in chemical composition, physiological action, contraindications and specific therapeutic uses. The undesirable after effects of sulfanilamide have long been established, and when sulfapyridine was introduced, it, too, was considered to have these characteristics, due to its close chemical relationship to the former. We have been warned repeatedly that anemia, leucopenia, hematuria and hemoglobinemia often result from the prolonged use of sulfanilamide, and that sulfhemoglobinemia may be produced when sulfanilamide is combined with compounds containing sulfate radicals, such as those found in saline purgatives. Logically, therefore, clinicians have been cautious in the use of sulfapyridine.

REPORT OF CASES

On April 20, 1939, a 4-month-old English Setter pup was presented for treatment at the veterinary clinic of Texas A & M Col-

*From the department of veterinary medicine and surgery, Agricultural and Mechanical College of Texas; presented at the 27th annual meeting of the State Veterinary Medical Association of Texas, San Antonio, Texas, January 11-12, 1940.

(Continued from preceding page)

ary through life in the form of articular blemishes extending into the shafts. They grow slowly and are not painful. Robin and Brion (*Revue générale de Médecine vétérinaire*, xl, May 15, 1931) regard these osteogenic growths as troubles of ossification due to infection of maternal origin. It is doubtful if any treatment, local or general, will reduce the enlargements.

lege. The dog was suffering with secondary bronchopneumonia that followed distemper, and it was decided to treat the affection with sulfapyridine. The animal was given 1 gr. of the drug per pound of body weight four times a day. At the end of eight hours the temperature began to recede, and in 24 hours it was normal. At this time the dosage was decreased to 0.5 gr. per pound of body weight, administered four times a day. This was continued until the end of the third 24-hour period. After the temperature reached normal there was no recurrence of fever, and the appetite improved steadily. Other treatment was merely reconstructive, in the form of tonics. The case was discharged in one week. This, incidentally, was the first case that we treated with sulfapyridine. Neither blood nor urine examinations were made.

Since that time the clinic has treated 17 pneumonia cases with sulfapyridine. Five of them were of primary origin, two resulted as secondary to post-parturient metritis of bitches, and the remaining ten were secondary to distemper.

Five cases were given the same dosage as that administered to the English Setter pup, and daily examinations of the blood were made. In all of the cases there was an increase in the leucocyte count, the total count varying between 15,000 and 18,000 per cmm., but there was no indication of white cell destruction. The total red cell count of one dog dropped nearly 1 million. In this case the drug was administered for 5½ days, and anemia was quite evident. All of the five dogs treated with the initial daily dose of 4 gr. per pound of body weight showed considerable weakness and irritability, but they recovered. Only the above-mentioned animal received the drug for a period exceeding 3½ days, since the others returned to normal temperature in that time. Nausea was observed in two of these cases but it was easily controlled by

giving equal parts of milk sugar mixed with the drug. The nauseated dogs also manifested considerable pain in the abdominal region which terminated when the drug was discontinued.

From a review of reports on human cases we concluded that the initial daily dose of 4 gr. per pound of body weight could be reduced. Therefore, the remaining eleven cases received sulfapyridine in the following dosage. Four dogs received 2 gr. per pound of body weight divided into four doses during the first 24 hours. This dose was decreased 50 per cent each succeeding 24 hours until normal temperatures were produced. This dosage produced normal temperatures in three to 3½ days. Nausea developed in one dog of this series and it was controlled by the use of milk sugar. The red cell count was not lowered and there was no indication of hemoglobinemia. Acute nephritis was found in one dog of this series following the treatment. This is the only case of nephritis which I have encountered with sulfapyridine treatment, and I do not attribute this to the use of the drug.

The dosage was reduced in treating the next series of four cases. They received daily doses of 1 gr. per pound of body weight. This was administered four times daily. The dose was decreased 50 per cent each succeeding 24 hours, as in the previous series. One case returned to normal temperature in two days, and another in four days. Recoveries were complete in these two cases. Of the other two cases one developed bacterial enteritis and, later, convulsions which terminated fatally. The remaining case suffered a relapse one week after the termination of the treatment with sulfapyridine and died of passive pulmonary congestion with edema of the lungs. Blood and urine examinations were negative, and there was no indication of nausea.

The remaining three pneumonia patients were treated with 0.5 gr. per pound of body weight divided into four equal doses during the first 24-hour period. Here again, the dosage was reduced 50 per cent each succeeding 24 hours. Of this group only one made a satisfactory recovery without the aid of other therapeutic agents. The second

dog died, and another recovered only after a pneumonia jacket had been applied. The condition of these animals did not appear to be more serious at the outset of the illness than that of the aforementioned cases.

Recently, sulfapyridine has been found to be of value in the treatment of affections other than pneumonia. Last fall two dogs suffering with acute tonsillitis were treated in our clinic with sulfapyridine. A bitch affected with post-parturient metritis responded well to treatment with this drug. For these cases the dosage was 1 gr. per pound of body weight given in four daily doses. This was decreased 50 per cent each succeeding 24 hours. There is no way to determine whether or not the results in these cases were obtained any more rapidly than they would have been had similar chemotherapeutic agents been used.

CONCLUSIONS

Observations made in treating the 20 clinical cases cited would seem to indicate that sulfapyridine is highly effective in septicemic diseases of dogs when given in initial daily dosage of 1 gr. per pound of body weight divided into four doses. It is recommended that this be decreased 50 per cent each succeeding 24 hours.

It also seems advisable to continue the use of the drug for at least 48 hours after the temperature reaches normal.

The time required to complete treatment with sulfapyridine in most canine patients is so short that there is little risk of kidney damage. Neither is there a great change in the blood cellular elements. It is not to be concluded that we recommend its use entirely without thought to the periodic examination of blood and urine.

Sulfapyridine may nauseate some individuals but this can be controlled by the simultaneous administration of an equal amount of milk sugar.

Recent observations show that the drug is of value in treating acute tonsillitis and post-parturient metritis, but the results with these cases did not surpass those recorded for similar chemotherapeutic agents.

Sclerosing Treatment of Rectal Prolapse in Dogs

By B. J. ELANDER, B.S., D.V.M.

San Diego, Calif.

THE MATERIALS required in the writer's method of treating rectal prolapse in dogs consist of a rectal speculum (a small vaginal speculum will answer the purpose if used properly), a glass syringe and a 3- to 4-in. 24-gauge hypodermic needle. Either quinine and urea hydrochloride or phenol solutions can be used, but in our hands a 5 per cent vegetable-oil solution of phenol has given the most satisfactory results. Mineral oil is contraindicated.

In preparing the patient for the treatment, boiled milk should be given for several days to produce constipation, which, in turn, provides a dry, clean rectum.

In general, the technic is as follows: The prolapse is replaced and the speculum inserted to the hilt and opened slightly. When one looks into the rectum, the prolapsed portion will be found to be protruding into the lumen of the speculum. The phenol solution is then injected in amounts sufficient to produce a swelling the size of a coffee bean. The speculum is removed, then placed in a different position and the injection repeated. This is continued until the prolapsed tissues can no longer be seen through the speculum. In cases where the injections are made while the tissues are prolapsed, a lubricant should be applied before replacing the prolapse.

The next step is to keep the tissues in place, and this is accomplished by keeping the finger in the rectum for five to ten minutes. Sedatives may be given to prevent straining. Severe prolapses may require daily treatment for six to ten days, or until no prolapsed tissues can be seen in the lumen of the speculum.

Following injection there is a temporary swelling at the point of the injection, but this subsides in a few hours. The injected tissues then become grayish and upon palpation feel like a cluster of grapes. These

structures disappear in three to four weeks.

The after care consists largely of preventing undue straining. Should the tissues prolapse again, they should be replaced with gentle pressure. Soft gauze saturated with an astringent jelly may be used in handling the inflamed tissues. Evacuation of the bowels should be avoided for two or three days. After this time mild laxatives and cold astringent enemas are indicated.

In our practice this method has proved superior to other procedures because it is painless, treatment can be applied during an office call and there is no danger of a stricture.

Contraindications for this line of treatment include irreducible prolapses, strangulated prolapses, and any form of intestinal disturbance associated with a diarrhea.

Lead and Coal-Tar-Pitch Poisoning in Cattle

By C. H. CASE, V.S.

Akron, Ohio

AN ARTICLE in the February 1940 issue of the JOURNAL, entitled "Coal-Tar-Pitch Poisoning in Pigs," by Robert Graham, H. R. Hester and J. A. Henderson, brings to my mind a similar affection that I encountered in two cows.

According to the owner, the cows went off feed, milk production decreased and one became partially blind and very thin. The herd consisted of about 40 head which were kept in a pasture in the fall, when everything was dry and there was little for the cows to eat. At first we suspected lead poisoning, on account of the blindness, but an examination of the pasture and farm buildings did not disclose any trace of lead,

in paint pails or other places, which might have been responsible for the poisoning. We did not know at the time that the cattle had recently been turned into another lot during the nights. This lot had been used to shoot clay pigeons. The blind cow died within a week and, upon autopsy, a quantity of shot, all that we could hold in one hand, was found in the reticulum. A large quantity of blood-like fluid was found around the base of the brain. This we attributed to the lead poisoning. The liver exhibited the same gross lesions reported in the aforementioned article.

The blindness and the other suggestive symptoms together with the finding of the lead shot and the brain lesions caused us to make a diagnosis of lead poisoning. However, after reading the article referred to I am wondering if we did not have a combination of both. It is a known fact among cattle practitioners that a very small amount of lead paint will kill a cow or calf. Just one lick on a freshly painted barn or fence is all that is needed to cause death. Therefore, the lead shot might be considered as partially responsible. The other cow made a complete recovery in about three weeks. None of the remaining cows sickened, although they were not allowed to pasture in the lot after the death of the first animal.

I recall one instance where two Jersey cows, pastured with 50 Guernseys, died of lead poisoning. In this case the lead pail had been in the pasture four years and during this time none of the other cows licked any of the white lead until the two Jerseys which had been purchased a short time previously, found the pail. How the cow mentioned earlier in this discussion licked up so many shot from the ground and what caused this desire is an open question. We attribute lead poisoning to the desire for the oil in the lead, but with the shot, we can not explain why cows want to lick them off the ground, unless it is a desire for the coal-tar pitch.

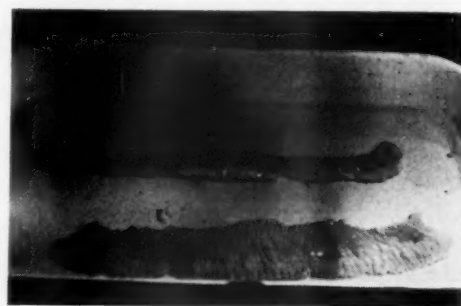
The teat canal is the channel of entrance for the flora of bovine mastitis.—Case.

Johne's Disease (= Paratuberculosis)

By W. J. BUTLER, D.V.S.

Helena, Mont.

JOHNE'S DISEASE was diagnosed in a band of Montana sheep during January 1940. This is the first time that the disease has been observed in sheep in this state. Our diagnosis confirms the findings of Howarth¹ and McEwan.² It is stated in *Pathology and Therapeutics of the Diseases of Domestic Animals*³ that "on postmortem



examination the mucosa of the small intestine and sometimes also of the large intestine is much thickened but not corrugated; its surface is uneven and coated with large quantities of mucus." Our observations are contrary to these as we found the mucosa of the small intestines not only thickened but corrugated (see illustration).

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Haley's comet (or was it Peltier's?) darted at the earth in 1910 and missed its mark just 16,000,000 miles, the astronomers declare.

Fox farming has become an important industry in Norway. It has over 18,000 fox farms and approximately 200,000 foxes.

SURGERY & OBSTETRICS

The Diagnosis of Virus Abortion in Mares*

By W. W. DIMOCK, D.V.M.

Lexington, Ky.

STUDIES of epizootic or virus abortion of mares have been carried on at the department of animal pathology, Kentucky Agricultural Experiment Station, since 1922, when in an outbreak of abortion among 20 mares, eleven of which aborted, the fetuses were found to be bacteriologically negative.

Between 1922 and 1932, several outbreaks of abortion in mares were studied with the result that cultivable microorganisms could not be demonstrated by whatever method used. In 1932, abortion was produced in two mares in the eighth month of gestation following intravenous and subcutaneous injection of thoracic and stomach fluids and the feeding of scrapings from the fetal membranes of an aborted fetus. A third mare so injected and fed did not abort. A fourth mare was given, intravenously, 10 cc. of a filtrate of thoracic fluid, stomach fluid and liver and spleen extracts from an aborted fetus. This mare aborted 32 days following the injection. The fetus was bacteriologically negative.

In two other instances the infectious nature of this type of abortion was well illustrated. The infection was carried to the stall of a pregnant mare by an attendant who helped to handle aborted fetuses. In the other case a pregnant mare was placed in a stall where an abortion had occurred. This mare aborted 21 days after being placed in the infected stall.

Virus abortion in mares presents a distinct clinical picture. The disease usually occurs as an epizootic. The aborted fetuses

are almost invariably bacteriologically negative. Occasionally, a bacterial infection is present in addition to the virus. A majority of the fetuses reveal a characteristic pathological picture that is peculiar to epizootic outbreaks of abortion in mares in which no bacterial infection is found. The disease is rather highly contagious in nature and while not all mares in a group abort either from natural exposure or experimental inoculation, a sufficient number are affected to indicate that the disease is of an infectious nature.

The characteristic features of virus abortion of mares may be enumerated as follows:

- 1) The disease usually occurs in epizootic form.
- 2) The mares expel the fetuses without showing indications of approaching abortion.
- 3) The fetal membranes are rarely retained.
- 4) The mares suffer no apparent physical reaction.
- 5) The genital tract returns to normal quite as promptly as it does following a normal parturition. Mares which have aborted may be bred the same season and will usually produce a normal foal the following year.

6) The gross pathology in aborted fetuses is rather uniform and consists of lesions not observed thus far in abortion due to other causes. The lesions observed on gross examination are a) small, multiple, grayish-white areas of degeneration in the liver; b) hemorrhages on the heart, spleen and lungs and congestion of the colic

*From the department of animal pathology, Kentucky Agricultural Experiment Station; the investigation reported in this paper was conducted in connection with a project of the Station.

lymph glands; and c) an excessive amount of fluid in the thoracic cavity. A single fetus may exhibit all the above-mentioned changes, or only one or two may be observed. Occasionally, serous fluid is present in the peritoneal cavity. In some cases the amnion is considerably thickened and edematous.

7) All aborted fetuses are bacteriologically negative, except that occasionally streptococci are isolated. *Shigella equirulis* may be encountered in foals which are born near term and live for a short time. Since these two microorganisms are the most common cause of prenatal infections in the newborn foal, they are assumed not to be related to the disease.

8) The blood of the mares is negative to the agglutination test for *Salmonella abortivo equinus* infection.

9) Mares immunized to *S. abortivo equinus* by vaccination are not protected against virus-abortion infection.

10) Susceptible mares abort following natural exposure and experimental inoculation with raw and filtered material from aborted fetuses.

11) Convalescent and hyperimmune serum seem to furnish some protection when used as an immunizing agent.

12) Histopathological sections of the liver show that the areas of degeneration observed on the surface extend throughout the liver substance. Areas of focal degeneration are less pronounced in other tissues and organs.

13) Further evidence that this type of abortion in mares is of virus origin is the occurrence of intranuclear inclusion bodies thus far observed most strikingly in sections from the liver and lungs.

In the liver the intranuclear inclusions are found in the parenchymatous cells, usually at the periphery of the small areas of degeneration. Similar inclusions may be found in the respiratory epithelium lining the larger bronchioles in the lungs. In two instances inclusion bodies were observed in the epithelium of the interlobular bile ducts. The typical inclusion bodies were intranuclear in position and acidophilic in staining properties. The basophilic chromatin is absent from the central portion of the nucleus but is collected at a number of

points in the inner margin of the nuclear membrane, leaving a clear space between the inclusion body and the displaced nuclear membrane. In most cases the inclusion appeared as a homogeneously stained mass of material, while in a few instances the mass appeared to be made up of numerous fine particles. In some cases, particularly in the hepatic cells, where there was marked degeneration, the quantity of cytoplasm was greatly reduced.

E. W. Goodpasture of Vanderbilt University has kindly examined sections of liver and lung and expressed the opinion that the intranuclear inclusions are typically viral in nature.

Chloral Hydrate Anesthesia

It would appear that the directions for anesthesia induced with intravenous injections of chloral hydrate were definitely settled through the studies of Marcenac, who fixed the dose and the solution to employ. The dose was 11 Gm. (2.75 dr.) per 100 kg. (220 lbs.) of body weight, with half as much citrate of sodium.

In the course of administering chloral in that dosage to asses in Occidental West Africa, the authors found that three times that quantity is required to produce the desirable degree of hypnosis. In fact, the dose prescribed by Marcenac produced practically no anesthesia at all. Thus, the following formula was substituted:

Magnesium sulfate

Chloral hydrate aa 10 Gm. per 100 kg., in normal salt solution 1:10. Several experiments were made to determine if the addition of magnesium sulfate would permit reduction of the quantity of chloral. The results showed that with the addition of magnesium sulfate the quantity of chloral could be reduced one half or more and still obtain the same depth of anesthesia. The authors do not insist that the same result would be obtained in horses, as the African ass is more resistant to chloral than the horse. (R. Kerguntul and Samb Bachirou. *Quelque Tentatives d'Anesthesie de l'Ane Soudanais par l'Hydrate de Chloral en Injection Intraveineuse. Bulletin des Services Zootechniques et Des Epizooties*, iii, October 1939, pp. 14-18.)

An Improved Artificial Vagina for the Collection of Stallion and Jack Semen^{*}

By V. R. BERLINER, Ph.D

State College, Miss.

THE GREAT progress in artificial insemination of farm animals achieved during this decade is due chiefly to better knowledge of the general problems of physiology of reproduction and to improved methods for collecting semen.

One of the obstacles facing the earlier workers was the inability to collect unadulterated semen that could be used for the study of sperm physiology and the insemination of females. E. Ivanov, in his pioneer work, and his followers used sponges introduced into the vagina of mares before service, but the losses in recovery were great (Polovzov¹), the sperm were damaged through contamination, and the dangers of spreading diseases of the genital organs of the mares were eminent. Roemmele,² Milovanov³ and others tried to eliminate these handicaps by using rubber sperm collectors of various designs that were inserted into the vagina of a female in heat, and were to serve as receptacles for the ejaculate. These devices never became popular because they were inconvenient and unreliable; it was difficult to hold them in the right position and frequently the ejaculate was lost.

It is interesting to note that at this stage two investigators, working independently in two countries, conceived the same idea for an important improvement, namely, the use of an artificial vagina for collecting the semen outside of the female. In this country it was McKenzie⁴ who made a primitive but efficient artificial vagina that was used successfully for the study of the processes of ejaculation and sperm physiology of boars. At the same time Milovanov³ in Russia produced several models of artificial vaginas that worked on the principle of providing a temperature and

pressure regulation by means of a hot water jacket.

This method of semen collection was then widely adopted in work with bulls and rams, but there still were many difficulties with the collection from stallions because the originally designed artificial vaginas were large, complicated instruments, hard to handle and difficult to construct. Since their outer wall was made of metal, they were not flexible, and difficulties were encountered in working with them, making it obvious that for stallions and jacks a more practical model had to be designed if the use of artificial insemination of workstock was to keep up with the extending utilization of this breeding method, used successfully on other species of farm animals.

Due to the absence of a practical artificial vagina for stallions, in many instances artificial insemination of horses was practiced whereby the semen was collected from the vagina of served mares, or with the breeder bag. In both methods, especially in the first, the danger of spreading disease was eminent.

In 1938, working with jacks and stallions, the writer⁵ attempted several improvements, working on the principle that the artificial vagina had to be pliable and at the same time strong enough to hold the water in the jacket and to maintain the necessary pressure around the glans penis. Milovanov³ stated that in the stallion the nerve endings stimulating ejaculation are located in the glans, and not in the penis root as in the bull. Therefore, in an artificial vagina the main cushion effect had to be on the end and not at the entrance of the vagina. This cushion effect was hard to obtain in the old types and frequently resulted in the slipping off of the liner. The models built on the new principle were made of one piece, thereby eliminating the chances of leakage, and they

^{*}Paper No. 32, new series, of the Mississippi Agricultural Experiment Station, department of animal husbandry.

were made entirely of rubber. Therefore, they could be pressed against the flank of the mare during collection and thus decrease any unnecessary bending of the penis. They were made in this laboratory out of tire inner tubes that were surrounded by an outer layer of stiff rubber sheets to provide some rigidity for easier handling. They were used continuously for two breeding seasons on many jacks and stallions, and were known as the Mississippi model of artificial vagina for stallions.

McKenzie⁶ introduced some improvements upon the new principles of this model, using for the first time straight rubber tubing of appropriate diameter that was stiffened by an outer casing of leather (Missouri model).

Both of these types had the disadvantage that they were hard to clean and to sterilize, since in both models the inner lining terminated in a cone to which the semen bottle was attached. This cone-shaped part was difficult to construct and was hard to reach for cleaning.

During the winter of 1939-1940, tests were made with a new model that eliminated this inadequate feature and incorporated improvements that made for easier handling (fig. 1). This artificial vagina is made of straight rubber tubing, 7 in. flat, as used first by McKenzie in the Missouri model. Two lengths of this tube make up the vagina, the inner tube being 30 in. long. The second tube is pulled over the inner one and is 5 in. shorter. On one end both layers are cemented together for a width of about 3 in. This end is turned back over a piece of stiff rubber hose that serves to hold open the entrance into the artificial vagina. The edge of the turned-back end is reinforced by cementing to it a strip of heavy rubber, and to this part is riveted a loop of leather or heavy rubber band, 12 in. long, which serves as a handle.

On the receptacle end, the outer layer is cemented to the inner layer, leaving the edge free for about 1 in.; that also is reinforced by a strip of heavy rubber. To this is attached by rivets a piece of rubber or leather 20 in. long to form a long loop. At the protruding end of the inner layer,

on the lower edge, a hole is cut, and a short piece of narrow rubber tubing 2 in. flat is cemented to the edges of the hole. To this stub is attached, by means of a radiator-hose clamp, a wide-mouth bottle which serves as the semen receptacle. The end of the inner tube is open at full width and permits cleaning of this end of the vagina, which was impossible in the cone-shaped models. Before using the vagina, this end is closed by a wooden clamp, the insides of which are lined with two strips of sponge rubber. On both ends of the clamp are thumb screws with which the clamp jaws are pressed together, the rubber lining on the clamps increasing the pressure, making for complete sealing and preventing a slipping off of the clamp.

One end of one of the clamp jaws is long so that one loop of the radiator-hose clamp holding the bottle to the hose stub can be slung around it. This prevents the bottle from swinging around excessively during collection.

When the vagina is being made ready for use, the inner surface of the artificial vagina is covered with a thin layer of mineral oil, the clamp is slipped over the open end of the vagina and tightened, and the receptacle bottle connected to the stub and attached with the radiator-hose clamp. Through a valve, hot water is pumped into the space between the two layers by means of a double-acting rubber bulb. Pressure and temperature have to be regulated according to the size of the stallions and their individual preference. McKenzie obtains good results by simply filling the vagina with hot water until the vagina becomes warm enough and washing it out with hot saline solution to remove traces of water. He uses the space between the layers to regulate the pressure by air. However, when working with jacks or nervous stallions, it is, in the writer's experience, more advisable to use the space between the layers to hold the hot water also, because in this manner the temperature can be maintained at the proper degree for a longer time, thus allowing for unforeseen delays.

For the collection, assuming that the

operator works on the right side of the mare or dummy, he slips the right arm through the long handle of the vagina end and slips the fingers through the short loop at the entrance, so that the handle rests on the hand. With his fingers he holds the vagina entrance. When the stallion or jack mounts the mare or dummy, the left hand is free to guide the penis into the vagina and assists then to push the vagina entirely over the penis. The air and the water in the vagina form the necessary cushion on the end of the vagina. The ejaculate runs directly into the receptacle and comes in contact with the rubber for only a short distance and a fraction of time. After the service the bottle is disconnected and the semen is ready for dilution and insemination. After the closing clamp has been removed, the vagina is cleaned and placed in a container with a disinfectant for sterilization. We have found that for this one

can use any disinfectant, provided the vagina is rinsed thoroughly with running water and hung in a dust-free space to allow evaporation of the vapors from the disinfectant. This is contrary to the older theories that no disinfectants, with the exception of alcohol, can be used on the instruments for artificial insemination.

This type of vagina is far easier to handle than the older models because one hand is entirely free. It does away with the outer stiff layer that sometimes interfered with the service. Most important, it can be cleaned thoroughly because one can inspect and clean the inside portion, which comes into contact with the penis of the stallion and with the ejaculate.

In recent years it has been stated frequently that the use of artificial insemination will not acquire the same importance in workstock breeding as it has in cattle breeding because of the danger of spread-

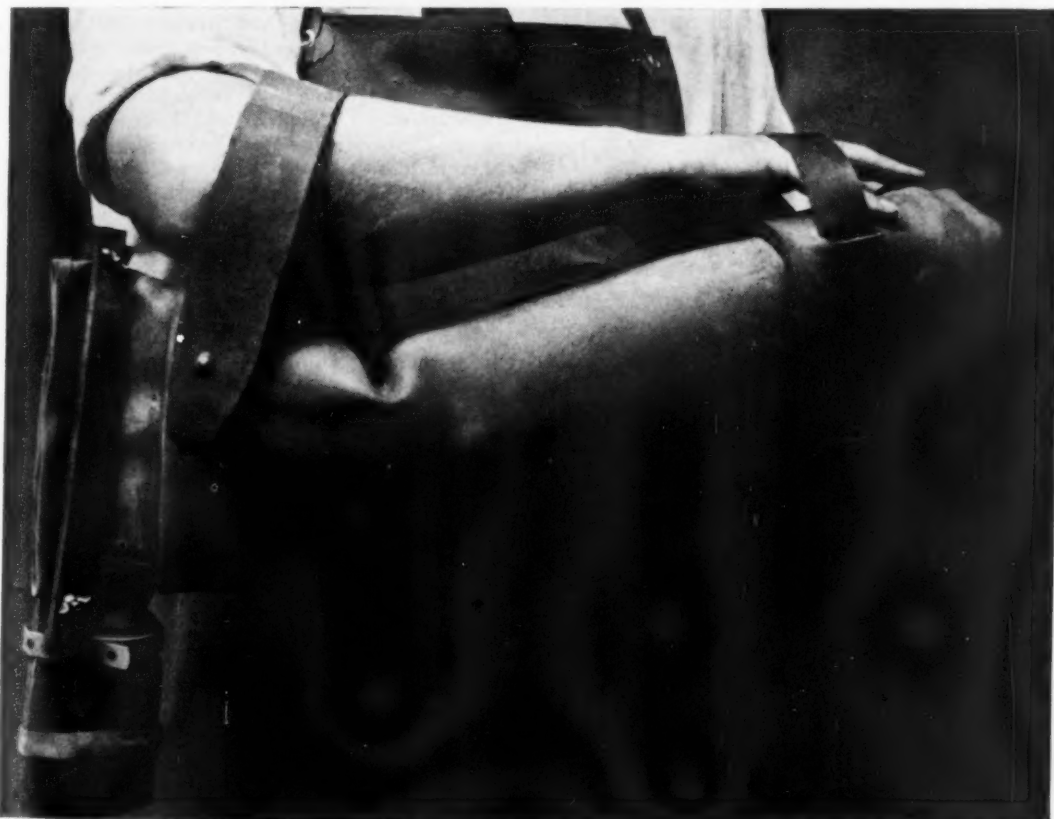


Fig. 1. New type of the artificial vagina for jacks and stallions (Mississippi model) that can be cleaned and sterilized easily.

ing disease. This statement was entirely correct at a time when the only way to collect semen was to aspirate it from the vagina of a bred mare. With the introduction of practical artificial vaginas, one of the main obstacles has been eliminated, and now the main effort may be concentrated on finding better methods for semen preservation.

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Cutaneous Neurofibroma in a Dog

By H. D. PRITCHETT, V.M.D.
Philadelphia, Pa.

ON DECEMBER 20, 1938, a 3-month-old female Doberman Pinscher was presented for treatment of a swelling on the face. The puppy was in an exceptionally good state of nutrition and had never been ill. The history seems to point directly to an etiology of a traumatic nature followed by infection and suppuration.

On December 6, the animal suffered a puncture wound on the face, below the right eye, which swelled sufficiently to close the proximal eye. It pointed, then drained, repeating this process several times. It finally healed but left a swelling at the point of injury which slowly increased in size. However, the eye structures were not involved.

Clinically, this swelling covered an area approximate the size of a 25-cent piece, and its convexity presented an elevation of one quarter of an inch; the skin was tightly drawn over the lesion and showed scar formation. On palpation the swelling appeared to contain fluid, in the center of which was

a flat, immobile but very hard body resembling very much an osseous process. The condition was diagnosed as a tumor of unknown classification.

The case was treated by surgical interference under general anesthesia established and maintained with 3 cc. of halatal injected intraperitoneally. The hard body appeared grossly to be an area of induration firmly adherent to the periosteum and surrounded by a cyst containing clear serum. Several secondary cysts protruded from the walls of the primary cyst. The entire cyst wall and its contents were removed by careful dissection and curettage. A section of the tumor was fixed in formalin and submitted to the pathological division of the federal bureau of animal industry, Washington, D. C., for histological examination. The report (M-295, 1-10-39) from the bureau read in part:

Histologically the tumor was found to be of the nature of a cutaneous neurofibroma. Concentric groups, and diffuse infiltrations, of large oval and polyhedral cells were seen scattered through the fibrous growth. The growth had invaded the musculature and also a small lymph gland in the involved area. Nerve elements consisting of interlacing bundles of fibrils, and numbers of well-formed, medullated nerve fibers, were a prominent feature of the small neoplasm. No mitotic figures were noted.

As there was no evidence of latent infection the incision was closed with five linen sutures and a compress dressing applied. The patient would not tolerate the dressing and eventually reopened the incision by rubbing her head against the kennel door. This accident necessitated open-wound treatment, which was successfully accomplished without further complications, and the patient was discharged on December 27, 1938.

Four months later the client advised that no recurrence of the original tumor was noted, but stated that the dog had gradually lost the sight of both eyes. The cause was not determined and the patient was consequently destroyed.

The body temperature of the elephant is the lowest of the mammals. It registers about 96.6°, as against 98.6° for man.

CURRENT LITERATURE

ABSTRACTS

The Use of Glucose in Equine Tetanus

The author, an army veterinarian, describes the successful treatment of a case of tetanus in an army horse. The animal first showed symptoms of the disease on April 30, 1937. The first symptoms observed were a stiff gait, diminishing appetite and prolapse of the nictitating membrane. On the following day the patient was barely able to move and stood stiff-legged with the feet spread far apart. The nostrils were distended and the jaws were tightly shut. The muscles of the neck, back and lumbar region were as hard as a board. A total of 300,000 units of tetanus antitoxin was administered during the first three days of the disease, without any noticeable improvement in the condition.

On May 3, the horse had gone down and could be raised only with the aid of slings. The patient hung motionless in the slings and was apparently moribund. At this time 100 cc. of a 50 per cent glucose solution and 20 cc. of a 25 per cent magnesium sulfate solution was administered intravenously. A slight improvement was observed a few hours later. The horse attempted to move the legs and raise the head so that 4 liters (4.2 qts.) of milk, 1 lb. of sugar and 5 tablespoonfuls of calcium chlorate could be administered by means of the stomach tube.

The next morning (May 4) 40 cc. of the glucose solution mixed with 10 cc. of the magnesium sulfate solution was injected intravenously, and 4 liters of milk, 0.5 lb. of sugar, and 5 tablespoonfuls of calcium chlorate were given with the stomach tube. The same evening the patient received 80 cc. of glucose solution and, since the heart was very weak at this time, 10 cc. of cardiazol. One ampule of eukodal (subcutaneously) and a chloral hydrate enema also were given to counteract the muscular spasms appearing at this time.

On May 5, the patient received 5 liters (5.25 qts.) of milk with 2 lbs. of sugar through the stomach tube, as well as 2 liters (2.1 qts.) of mineral oil and 200 cc. (6.6 oz.) of castor oil to overcome a slight constipation. The glucose injections were continued as on the previous day. The next day (May 6), the patient received an injection of cardiazol in the morning and one of caffeine at night, besides 60 cc. of glucose solution and 10 cc. of magnesium sulfate solution. Four liters each of milk and strained oatmeal, 1.5 lbs. of sugar and 5 tablespoonfuls of calcium chlorate were administered through the stomach tube. All other intake of food was prevented by muzzling the animal.

On May 7, four days after the patient was placed in the slings, a marked improvement in the general condition and abatement of the muscular spasms were observed. This improvement continued during the further course of the disease. From May 8 to May 19, the patient received daily 100 cc. of 50 per cent glucose solution intravenously. He also received three more 10-cc. injections of 25 per cent magnesium sulfate solution. Five to 6 liters (5.25 to 6.3 qts.) of milk mixed with 6 liters of strained oatmeal, 0.5 lb. of sugar, and 4 tablespoonfuls of calcium chlorate were given daily by means of the stomach tube.

Twelve days after the first glucose injection and 15 days after the onset of the disease, a general relaxation of the muscles was apparent. The horse was then able to get the head down to the floor, and the slings were removed. The injections of glucose were continued as was the feeding through the stomach tube to prevent foreign-body pneumonia. On May 20, the patient was completely free from all symptoms of tetanus and was placed in a box-stall and

fed in the usual manner. Although the animal was naturally very emaciated at this time, he soon gained weight and was again placed in regular service on July 24.

The author suggests that if larger amounts of the 50 per cent glucose solution are administered intravenously, it might not be necessary to resort to feeding the animal through the stomach tube, especially in less severe cases. The favorable action of glucose in tetanus is attributed to the following factors: 1) Its general metabolic action; 2) its specific metabolic action on the liver by rapid replacement of the glycogen used in removing the body toxins; 3) a possibly specific metabolic action on the carbohydrate content of the nervous tissue, thus favorably influencing the muscular spasms; and 4) its heart-stimulating action. (*Dr. Voegelé. Tetanusbehandlung beim Pferde mit Traubenzucker. Zeitschrift fuer Veterinaerkunde, li, June 1939, pp. 279-285.*)

Calfhood Vaccination

During 1938 and 1939, 188 heifers from a herd used to produce raw certified milk were added to a herd under study. Of these additions, 142 were vaccinated in accordance with the accepted calfhood vaccination plan and 46 were left as controls. Every member of this herd is tested once a month and all reactors are removed and slaughtered. Depending upon exposure to natural infection, 34 per cent of the controls and 8.5 per cent of the vaccinated subjects reacted. It also was observed that first-year heifers produced a little less milk than purchased cows, but after the first year the results are in favor of the home-raised heifers.

During the aforementioned period 189 negative cows were added to the herd and, also during the same period, 28 home-raised heifers and 170 cows were removed from the herd as reactors to the agglutination test. (*A. M. Mills. A Report on Bang's Disease Vaccinated Heifers in an Infected Herd. The Cornell Veterinarian, xxx, April 1940, pp. 195-196.*)

Encephalomyelitis Enzoötica Suum in Austria

A new infectious disease of swine was first described in 1930. It was called "Teschener disease" after the town where it was first observed, or "infectious swine paralysis" after the most pronounced symptom. This disease has spread rather rapidly from Czechoslovakia and is becoming prevalent in Austria. The first cases were diagnosed as a feed poisoning, but it was soon found that veterinarians in southern Bohemia were very familiar with the symptoms produced by this disease.

Infectious swine paralysis is caused by a filtrable virus. Garbage containing the brain and spinal cord of infected animals is the most common source of infection. It is certain, however, that the disease may be transmitted directly from animal to animal. The incubation period varies from three to 30 days. The prodromal symptoms, lasting for one or two days, consist of weakness, inappetence, vomiting and constipation. Then follows a period of excitement, also lasting one to two days. The symptoms during this time are spasms, forced movements, staggering gait, tonic-clonic spasms, increased skin and muscular sensitiveness upon touching, nystagmus and vomiting. During the paralytic stage which follows, the animals are unable to rise and have cramps and nystagmus.

The mortality is very high, at times amounting to 70 per cent of the infected animals. Pigs and young hogs weighing up to 30 kg. (66 lbs.) have the best chance to recover.

Postmortem Findings.—Klobouk reports the presence of small pneumonic foci spread over the lungs in more than 50 per cent of the cases. Macek gives as the most important finding the always-present pathological changes in the intestinal mucosa, all or part of which is swollen and hyperemic. The mucosa of the stomach is in most cases swollen, partly in folds, and strongly hyperemic. The intestinal mucosa also is covered with mucus and shows longitudinal folds, and at times cross folds. The combs of these folds are red in acute cases and brown to gray in chronic cases.

Treatment of advanced cases is not suc-

cessful. Subcutaneous injections of polysan emulsion (polysan is the trade-name for a colloidal magnesium hydroxide) have been used in the treatment of early cases and as a preventive. Klobouk has prepared a vaccine which is said to protect susceptible animals, but it apparently takes four weeks until immunity is established.

Diagnosis is made primarily on the basis of clinical symptoms, which in general are rather uniform, while postmortem findings alone do not permit a positive diagnosis.

It is the purpose of the article to report an infectious disease of swine which is spreading rapidly and for which veterinarians should be on guard. (*Ludwig Rimpl. Auftreten der Encephalomyelitis enzoötica suum in Oesterreich. Wiener Tierärztliche Monatsschrift, xxvi, January 1939, pp. 1-6.*)

Anterior Pituitary Hormones in the Treatment of Ketosis

The clinical use of anterior pituitary extract (A.P.L. solution*) and pregnant mare serum (gonadin†) would indicate that these products are of some value in the treatment of ketosis. It is believed that these agents are able to inhibit to a certain extent the production of ketone bodies in the liver. Altogether, 17 cases were studied, 13 of which were treated with A.P.L. solution, two with gonadin, one with another anterior pituitary-like agent, and the last with a combination of the last-mentioned product and A.P.L. solution. It was apparent that this line of therapy was all that was needed in certain cases.

Ten cc. was the usual dose employed in the treatment of the aforementioned cases. To bring about a more prompt and lasting recovery and an early return of milk, dextrose, calcium gluconate and chloral hydrate also are indicated. In this connection, it is important to bear in mind that hormone products of this type also exert an influence on the ovaries. What effect their use on ketosis cases will have on the reproductive processes later, remains to be seen.

It also was reported in this study that

ketosis often is complicated by other disease processes. Metritis is one of the most common complications. It is important that the complications be treated too, in order to effect a lasting recovery. (*M. G. Fincher and C. E. Hayden. The Anterior Lobe Hormones in the Treatment of Ketosis in Dairy Cows. The Cornell Veterinarian, xxx, April 1940, pp. 197-215.*)

The Treatment of Anaplasmosis

Saline purgatives or similar agents in moderate doses are indicated in the treatment of anaplasmosis, as visibly sick animals are usually constipated. Large quantities of water should be provided and, when necessary, administered *via* the stomach tube. In case of weakness, strychnine and camphor are of value. Sodium cacodylate is the most generally used drug at the present time and should be administered intravenously. However, the value of sodium cacodylate has not been demonstrated through well-grounded experiments.

Boynton has recommended the intravenous injection of 1 liter (1,000 cc.) of a 5 per cent solution of dextrose in distilled water to which has been added a sufficient amount of sodium cacodylate solution to provide a dose of 1.6 to 1.9 Gm. (25 to 30 gr.) per 45 kg. (100 lbs.) of body weight. The solution of the drug which is added to the dextrose solution consists of 0.29 Gm. (4.5 gr.) of sodium cacodylate per cc. of water. Some veterinarians have reported good results with a 2 to 4 per cent solution of mercurochrome. This line of treatment produces a desirable purgative action. Fowler's solution in 30-Gm. (1-oz.) doses given twice a day also has given good results when administered early in the attack. It may be administered as a drench, on the feed, or in the drinking water. (*G. W. Stiles. Anaplasmosis in Cattle. Circular 154, United States Department of Agriculture, December 1939, pp. 1-10.*)

On April 1, 1940, pork in storage totaled 653,552,000 lbs., which is an increase of 130,000,000 over April 1, 1939. The amount of pork in storage now is the largest since June 1937, while the amount of beef dropped one third this year.

*Jensen-Salsbery Laboratories, Inc., Kansas City, Mo.

†Cutter Laboratories, Berkeley, Calif.

BOOK NOTICES

Mammalian Genetics

Mammalian Genetics is a summation of present-day knowledge of the subject dedicated to none other than the celebrated C. D. Davenport "by a grateful pupil," William E. Castle of Harvard.

While genetics is a relatively new science that quickly takes the reviewer into the hidden mysteries of the initial processes of life, it is truly a fundamental branch of livestock production and veterinary science that must somehow be mastered in so far as known facts and plausible theories permit. The rudimentary knowledge of reproductive physiology and the science of eugenics, which have had to serve as the basis of elementary veterinary medicine, no longer suffice as the starting points of a veterinary education. To be well grounded one must understand the biological processes which ulterior influences do not materially modify. One must know his genes, his chromosomes, his gametes, and other "plasms" yet to be catalogued in the general language, to comprehend the origin of the new mammal and the specific rôle of these through life. In short, in reading through a book like this, one is deeply impressed with the fact that the teachings of ecology without the genetic potential are pretty empirical in animal production.

Heredity in General, well told in chapter I, lays down the groundwork for a better understanding of the chapters on Mendelian Inheritance, Linkage, Hybridization and Vigor, Sex Determination and Differentiation, Sex-Linked Inheritance in *Drosophila* and Mammals, Inheritance of Blood Groups in Man and Rabbits, Multiple Alleles, Lethal Genes, Pathological Genes, Maternal Inheritance, Inheritance of Body Size, Variations in Selection, Contributions of Fish Genetics, and the More Important Gene Mutations of Domestic Mammals.

The chapter on lethal genes and balanced lethals is particularly important to practitioners of veterinary medicine, since these are factors in the etiology of fetal death

which are not now omitted in profound studies of sterility and abortion. Obviously, in our studies of anemia of the newborn, the lethal gene can not be overlooked consistently, since (in rats) it has a deadly effect upon hemoglobin values. Even though mother's milk is ample, the young sicken and perish. This factor (lethals) exists in cattle and, as the author points out, it is the cause of "much concern to cattle breeders." The fact that hairless calves, "amputated" calves and short-spined calves (taillessness), attributed to this cause by Mohr and Wriedt (Norway), have been erroneously passed off in veterinary practice as phenomena of malnutrition, proves up the importance of genetics in animal production (zootechnics).

While this reviewer would not presume to pose as a qualified critic of the text, it is obvious that every chapter reflects a profound knowledge of the subject, clearly expressed. Where needed, pictures, drawings, graphs and tables are not lacking. The book is regarded as a precious addition to our library. (*Mammalian Genetics*. By William E. Castle, professor of genetics, Harvard University, research associate in genetics, University of California. Harvard University Press, Cambridge, Mass., 1940. Illustrated. 169 pages. Price, \$2.00.)

Normal and Surgical-Pathological X-Ray Pictures of the Horse

The author states in the introduction that his reason for preparing this work is the absence of suitable reference material on x-ray diagnosis in the horse. The book should be of great help to the practitioner who takes x-ray pictures, and it will serve as a guide in the reading and interpreting of the results.

X-ray photographs of the normal parts are shown first. These are profusely labeled and described. The pictures of abnormal

specimens include various kinds of fractures, sidebone, ringbone, spavin, splintered teeth, neoplasm in the nasal passage, stenosis of the trachea due to the formation of scar tissue, ossification of various tendons, dislocations, luxations, etc. Each illustration is accompanied by a brief history.

Since this reviewer is not an authority on x-ray, the text illustrations were shown to a hospital physician who is considered an expert in this field. After studying them carefully, he commented, "The equipment used must be very good; the technic and reproduction are excellent." (*Gottfried Mueller, chief staff veterinarian and chief of clinics in the army horseshoeing school at Berlin. Georg Thieme, Leipzig, 1940. 160 pages with 130 x-ray illustrations. Price, RM. 33.00 [unbound], RM. 35.00 [bound].*)

American Veterinary History

The *litterateur* who sets out to write veterinary history is a hero—a hero without hope of material indemnification. The financial reward runs around zero, if not into the minus column.

Important as history is to the hegemony of human effort, the hunger for it among the busy veterinarians of the hour verges in the general direction of complete anorexia. The history-minded platoon among us is yet to be born in sufficient numbers to absorb the publishers' smallest output of that sort of literature. The general habit of taking time out to read about what and who have gone before lies in the future. Only the architects of the house in which we live with more or less honor and distinction use history as a guide for making up their blue prints. Others, content with a flimsy shack, live on unaware of past events and pastmasters. Yet, those who have "taken pen in hand" to write veterinary history have lived longer in the hearts of their offspring than any other class of writers. Denizens of brilliant scientists are apt to be forgotten long before their contemporaries who sacrificed time, effort and money in writing authentic historical data, for, sketchy and drab as their writings may seem, future generations will somehow ex-

hume and make good use of what they have set down in the records.

So, when we received for review the 30-page, paper-covered multigram, *American Veterinary History, Part I*, we were prompted first of all to compliment the author for making an effort to compile important facts about the American veterinary service of the early days. Needless to remind the connoisseur that, at best, veterinary medicine before the discovery of this hemisphere by Europeans, during the colonial period of American development, and up to the founding of veterinary schools, is indeed a dark chapter. Yet, by drawing upon the imagination and the laws of probabilities, the historian can readily portray the scaly cornerstone upon which the veterinary profession of this country was built. The backwardness of the early inhabitants of this hemisphere, compared with the glorious oriental civilizations, is attributed to their failure to domesticate the existing fauna. This the author incidentally points out. Only the dog and the llama, and these to but a limited extent, were utilized by the occidental aborigines. Milk-producing mammals were not domesticated. The belief that deer were once used for that purpose in the northeastern part of the North American continent lacks proof. The buffalo was too wild, the author says. Perhaps, however, backwardness, in the absence of wheeled vehicles, was more the deterrent than the wildness of these large and abundant American herds. The dog of the Aztecs and the llama of the Incas were obviously the first animals to receive medical attention on this side of the Atlantic. Both were highly esteemed and the aborigines had their "medicine man."

With the discovery of America came domestic animals and likewise the charlatan-ism which lived practically unchanged until the 1870's, when chairs of veterinary science were established in the agricultural colleges and systematic veterinary education was founded. Correctly speaking, the 1870's mark the beginning of a veterinary service in the western hemisphere, save for two schools started in Canada during the previous decade. Until then, books, farm

papers and quackery galore governed veterinary development.

The brochure contains interesting biographical sketches of early American veterinarians and a long list of references for those who desire details. The author errs in naming Louis XIV as the founder of the veterinary schools of Lyon and Alfort. That honor goes to his successor, Louis XV (1710-1774). Louis XIV died nearly half a century before any veterinary school was founded. The dates given for the founding of veterinary schools in various European countries do not correspond to those set down in *Histoire de l'École d'Alfort*, which are generally believed to be correct. Berlin and Munich were founded in 1790, not in 1793. Discrepancies of a year or more for other early veterinary colleges require revision, granted that the history (*loc. cit.*) is not in error.

Quite apropos is the credit given to Benjamin Rush of the University of Pennsylvania for lectures (1807) on the importance of veterinary medicine, which, all agree, led slowly through succeeding decades to our present system of veterinary education. (*American Veterinary History, Part I. By Bert W. Bierer, V.M.D. B. W. Bierer, Baltimore, 1940. 30 multigraphed pages.*)

Report of the Institute of Public Health, Italy

Rendiconti, Istituto di Sanità Pubblica, Parte III, Rome, is a well-illustrated book of 560 pages containing important articles on questions of public health, a chapter covering biological research throughout the world, a brief report of the Fourth International Congress of Comparative Pathology (title translated), which was held in Rome in May 1939, a voluminous section on the analysis, inspection and control of alimentary products, and various materials of provincial interest.

The chapter on biological research contains a two-page map of the world spotting the locations where biological research is carried out in noteworthy manner and extent. Among them for North America are:

Washington, Baltimore, Princeton, New York, Boston, Philadelphia, Toronto, Chicago, New Orleans, Tallahassee, San Francisco, Panama, Ann Arbor, Lake Douglas, Nashville, and others of lesser importance. The names of the laboratories and their special work are given. Of interest in veterinary medicine are the U. S. bureau of animal industry, the zoölogical division of the United States Public Health Service, the department of comparative pathology of Harvard, the Rockefeller Institute for Medical Research, and the departments of parasitology in various universities (Tulane, Chicago). The map indicates that the United States and Russia lead in research laboratories of the upper cadre. The numbers correspond to the vast area they include and, obviously, to the variety of climatic conditions and terrain. Fine pictures of the School of Hygiene and Public Health at Baltimore, of the Biological Station at Lake Douglas (University of Michigan), and of the School of Tropical Medicine, Puerto Rico, lend enchantment to this excellent volume.

The reader is reminded that the word "entozoölogy" was coined by the Italian author Francesco Redi in 1684, who described 14 cestodes, three trematodes, 40 nematodes and three acantocephala. Among the trematodes was *Fasciola hepatica*, of which he gave an accurate description. He also described the egg of *Ascaris*. It was, however, not until the middle and last half of the 19th century that the study of these parasites became precise.

The report of the Fourth International Congress of Comparative Pathology mentions such well-known visitors as Greig (Scotland), Dalling, Andrews (England), Verge, Bourdelle, Panisset, Urbain, Brocq-Rousseau (France), Fluckiger (Switzerland), Domagk (Germany) and de Blicck (Holland). (*Istituto di Sanità Pubblica, Volume II, Part III. Public Document of the Minister of the Interior, 1939, pp. 711-1260. Written in Italian.*)

Women are not as susceptible to pneumonia as men.

THE NEWS

A. V. M. A. Activities

The Committee on Award of the 12th International Veterinary Congress prize, to be presented at the 77th annual meeting of the Association in Washington to the veterinarian who, in the opinion of the Committee, has made the most valuable contribution to the profession, will be glad to receive, before June 1, nominations for the recipient of the award for this year.

At the time of the foundation of this prize, a permanent committee on award was established, with the following membership: The chief of the federal bureau of animal industry; the chief of the Veterinary Corps, United States Army; the chairman of the Executive Board of the A.V.M.A.; a representative of the profession to be appointed by the president of the Association; and the president, who acts as chairman of the Committee.

Nominations for the 1940 prize should be sent to the president, Cassius Way, 25 Vanderbilt Ave., New York, N. Y., together with five copies (one for each member of the Committee) of a statement outlining the qualifications of the nominee. Each member of the Committee will review the recommendations and designate his choice from the nominations submitted. Nominations close June 1, 1940.

John R. Mohler of Washington, D. C., addressed the Alabama Polytechnic Institute student chapter of the Association at Auburn, Ala., on the evening of March 5.

The officers of the Women's Auxiliary for 1940 are as follows: Mrs. C. H. Case of Akron, Ohio, president; Mrs. C. M. Haring of Berkeley, Calif., first vice-president; Mrs. Ashe Lockhart of Kansas City, Mo., second vice-president; Mrs. G. G. Graham of Kansas City, Mo., third vice-president; Mrs. John H. Gillmann of Memphis, Tenn., fourth vice-president; Mrs. G. G. Graham, loan fund secretary; and Mrs. S. E. Hershey of Charleston, W. Va., secretary-treasurer.

The fine cooperation of junior chapters in the colleges stands among the achievements of the year 1940 in regard to the progress the Asso-

ciation is making toward developing a unified profession.

By the end of June, the membership will have reached 6,000, which in terms of finance means an income of \$30,000 a year from memberships alone. The executive office, however, is aware that publishing a journal is a precarious business that must be conducted upon sound administrative principles. The existing and potential income from advertisers is not being overlooked, since the ratio between reading material and advertising space is one of the principal factors governing a publication's financial stability.

Executive Secretary Merillat will act as toastmaster at a celebration to be staged by the Eastern Iowa Veterinary Association, Inc., at Cedar Rapids, May 2, in honor of the 50th anniversary of the graduation of James H. Spence of Clinton, Iowa, and Edwin A. Burton of Vinton, Iowa, from the Chicago Veterinary College.

Assistant Executive Secretary Ingmand was interviewed in a broadcast over Station KRNT in Des Moines, Iowa, the early part of April, on the importance of the veterinarian to the livestock industry of Iowa.

Merillat and Ingmand were in attendance at the April meeting of the Chicago Veterinary Medical Association and of the Eastern Illinois Veterinary Medical Association. They also attended the public hearing on the serum-marketing agreement conducted by the U. S. Department of Agriculture, April 23, in Chicago.

Members who have not filled in and returned the Vital Statistics blank will please do so without unnecessary delay. The taking of a census of the membership is the first step of a planned program to improve the veterinary service. Out of a membership rapidly approaching 6,000, 1,469 members have not yet replied. Members who have mislaid the blank and desire to respond will be furnished with a new blank on request. While the returns (4,131 as this issue goes to press) will serve a useful purpose, they are but a clue in the solution of the problem at hand.

Prepare to Visit the National Capital in August

A Statement from the Board of Governors Regarding an Unfortunate Advertising Endorsement

Many members of the Association have been concerned during the past month about the publication in two national magazines of a page advertisement for a dog food, in which the name of the A.V.M.A. appeared prominently. The advertisement contained a special offer of a new book on the care of dogs. The foreword to the book was written by the executive secretary of the Association. The headline of the advertisement quoted from the foreword and displayed the name of the executive secretary, his title and the name of the Association in large type.

The advertisement was prepared in such a way that a casual reader could fairly conclude that the A.V.M.A. had endorsed the dog food. When the advertisement was noted, a meeting of the Board of Governors was called immediately. Many letters and telegrams were received from the membership protesting against the use of the name of the Association in advertising a commercial product.

The situation was aggravated by the fact that negotiations have been going on for some time to improve conditions in the dog-food industry. A committee appointed by the Executive Board of the Association has been cooperating with the committee on foods of the American Animal Hospital Association in an effort to increase the number of dog-food manufacturers participating in the program. The food manufactured by the advertiser in question has not been tested by the food committee and, therefore, has not been approved.

At the meeting of the Board of Governors the decision was made to send letters to the advertiser, to his advertising agency and to the publisher of the book offered in the advertisement. This action was decided upon following consultations with counsel. The letter to the advertiser read as follows:

Dear

The Board of Governors of the American Veterinary Medical Association have had called to their attention the advertisement appearing in the April 1st issue of "Life" and the March 31st issue of "This Week." We are, to put it mildly, shocked to think that a company of your standing would use the name of our association without our approval in advertisements promoting the use and sale of your product. Particularly so in view of the negotiations we have been having, looking toward the correction of the conditions prevailing in the dog-food industry.

As you know, this product has not been approved by our association. It has never been tested by us. It follows that this advertising constitutes, in our opinion, a misrepresentation which is prohibited by law, and is the type of misrepresentation which the Wheeler-Lea Bill was put on the statute books to prevent.

The executive secretary was not authorized to grant to anyone permission to use the name of

this association for any purpose, and particularly for purposes such as those set forth in these advertisements.

The professional integrity of a veterinarian is his most valuable asset. The American Veterinary Medical Association has spent 77 years in building up the American public's trust and faith in the veterinary profession and the Association's members. Today, the Association's membership comprises approximately 6,000 of the outstanding veterinarians of the country.

We greatly fear that the use of our name in advertisements such as the one you have published destroys professional standing and public confidence in members of the Association. The loss of this public confidence will cause irreparable damage to our member veterinarians in the eyes of their clients, who are the leading animal owners of the nation. We are loathe to believe that this was a deliberate attempt on your part to appropriate to yourselves the use of our name in an involuntary approval of your product.

Before referring this matter to our counsel with the instructions to take appropriate legal steps with the Federal Trade Commission and with the courts to prevent the continuance of our name in this advertising, we would urge that you write to us advising just what your stand is and at the same time advise us if you are willing forthwith to discontinue the use of our name in your advertising. Furthermore, whether you are willing to discontinue the distribution of this book containing the name of our association.

Very truly yours,

The letter to the advertising agency read as follows:

Dear

Attached hereto you will find a copy of a letter which we have sent to your client.

We have been advised that this copy has been prepared by your organization. We can not understand how an organization of your standing would permit the use of our name in the manner indicated without first obtaining our consent.

We will hold you strictly accountable for any damages that we will have sustained by reason of the unauthorized use of our name.

Will you be good enough to advise us by return mail that you will forthwith discontinue so doing, and also what steps you will take to repair the injury which we have sustained?

Very truly yours,

The letter to the publisher read as follows:

Dear

We have seen the dust jacket and the foreword of the book, entitled, which is published by your company.

This dust jacket and foreword bear the name of our association and create the impression that we have endorsed this publication. The use of our name in this way is unauthorized. The inference that we have endorsed this book is a misrepresentation. We must ask that you immediately discontinue the use of our name upon the dust jackets and in the foreword of the book.

Pending the solution of this matter, we advise you that we will hold you strictly accountable for any damage which this association sustains by reason of your unauthorized use of our name.

Very truly yours,

A reply has been received from the manu-

facturer of the dog food which acknowledges the receipt of our letter and states: "Your complaint will be thoroughly investigated and you will be advised of our views in the matter."

The publisher of the book also has responded, stating that he communicated at once with the advertising agency from whom material and instructions were received for making the book. The publisher says that he is advised that the advertising agency received a full release from the executive secretary for the use of the foreword and his title in connection with the book, and for advertising purposes. The publisher's letter concludes that he is asking an executive of the advertising agency to communicate with the Association, since the publisher is merely in the position of manufacturer and distributor of the book.

As this is written, a decision regarding definite action is pending. Prominent advertisements bearing the name of the A.V.M.A. continue to appear. It is needless to say that the Board of Governors greatly regrets this incident and the damage which has been done to the Association. No executive officer ever has been authorized to use the name of the Association in such manner and, in the future, will not presume to sponsor the use of the name of the Association without the express approval of the Board of Governors and the Executive Board.

H. W. JAKEMAN,
CASSIUS WAY,
A. E. WIGHT,
Board of Governors.

APPLICATIONS

First Listing*

ACKERMAN, CLYDE E.

18343 Ventura Blvd., Tarzana, Calif.
D.V.M., Kansas City Veterinary College, 1915.
Vouchers: W. L. Curtis and John L. Tyler.

ANDRICH, JOHN JOSEPH

Portage la Prairie, Manitoba.
B.V.Sc., V.S., Ontario Veterinary College, 1940.
Vouchers: R. A. McIntosh and A. F. Bain.

ANTHONY, CARTER H.

Veterinary Hospital, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.

ASTLE, NEVILLE LA VON

1605 Anderson, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and Lee M. Roderick.

BAILEY, JOHN G.

711 E. Broadway, Milton, Pa.
V.M.D., University of Pennsylvania, 1917.
Vouchers: Eugene B. Ingmand and A. Henry Craige, Jr.

BARNES, MANSEL O.

203 Federal Bldg., Olympia, Wash.
B.S., D.V.M., State College of Washington, 1927. Vouchers: James C. Exline and R. A. Button.

BARRY, JAMES R.

408 Vermont St., Waterloo, Iowa.
D.V.M., Iowa State College, 1929. Vouchers: E. W. Burke and A. L. Blake.

BEARD, THEODORE MASON

1211 N. Van Buren, Topeka, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.

BEAT, VICTOR BERNARD

1909 Anderson, Manhattan, Kansas.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.

BEECHWOOD, C. THEO.

c/o Rieck McJunkin Dairy Co., Meadville, Pa.
V.M.D., University of Pennsylvania, 1917.
Vouchers: Eugene B. Ingmand and A. Henry Craige, Jr.

BENNETT, CALVIN FORREST

119 E. South St., Corry, Pa.
V.M.D., University of Pennsylvania, 1917.
Vouchers: Frederic F. Fehr and William J. Lentz.

BIRD, ABELARDO GARCIA

Box 7, Fajardo, Puerto Rico.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.

BLAKELY, C. LAWRENCE

180 Longwood Ave., Boston, Mass.
V.M.D., University of Pennsylvania, 1933.
Vouchers: Gerry B. Schnelle and E. F. Schroeder.

BOEHM, JAMES A., JR.

Hollywood, Fla.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and L. A. Merillat.

BORMAN, B. H.

426 S. Park St., Madison, Wis.
D.V.M., Chicago Veterinary College, 1916.
Vouchers: James S. Healy and W. R. Winner.

BOYD, WILLIAM JOHN

716 Nevin Ave., Sewickley, Pa.
V.M.D., University of Pennsylvania, 1933.
Vouchers: Eugene B. Ingmand and A. Henry Craige, Jr.

BROWN, JAMES MILTON

4881 Wicopee Ave., Los Angeles, Calif.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.

*See January 1940 JOURNAL.

Prepare to Visit the National Capital in August

- BUCKINGHAM, RICHARD GILPIN
W. Montgomery Ave., Rockville, Md.
V.M.D., University of Pennsylvania, 1938.
Vouchers: William M. Mohler and John R. Mohler.
- BUENTE, FREDERICK L.
1016 Vattier St., Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- CANTWELL, HOWARD SIDNEY
625 La Cadena Drive, Riverside, Calif.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- CARNES, BILL MILTON
1102 Cummings, Henryetta, Okla.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- CASE, GLEN IRVILLE
330 Bertrand, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- CASE, LEWIS ISHAAM
3235 Main St., Hartford, Conn.
B.V.Sc., V.S., Ontario Veterinary College, 1940. Vouchers: R. A. McIntosh and A. F. Bain.
- CASE, RICHARD ALFORD
330 Bertrand, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- CASHIN, JOHN PATRICK
Tunkhannock, Pa.
V.M.D., University of Pennsylvania, 1937.
Vouchers: Eugene B. Ingmand and A. Henry Craige, Jr.
- CHERRY, LLOYD DALE
1126 Laramie, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- COANE, MILTON DAVID
1710 Nottingham Way, Trenton, N. J.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.
- COOK, T. PURDY
Rochester, Ind.
D.V.M., Indiana Veterinary College, 1911.
Vouchers: M. T. Cox and J. C. Schoenlaub.
- CRUMP, LE ROY SEYMOUR
Fort Atkinson, Wis.
M.D.C., Chicago Veterinary College, 1911.
Vouchers: James S. Healy and W. R. Winner.
- DAVIDSON, WILLIAM GEORGE
1021 Davis St., Evanston, Ill.
V.S., B.V.Sc., Ontario Veterinary College, 1935.
Vouchers: Eugene B. Ingmand and C. N. Bramer.
- DEAL, CLYDE EUGENE
119 Cox St., Auburn, Ala.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.
- DEAN, CHARLES ROSS
255 E. Thach Ave., Auburn, Ala.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.
- DEAN, STANLEY L.
Delancey, N. Y.
D.V.M., Cornell University, 1914.
Vouchers: M. J. Kemen and A. W. Sutherland.
- DEUBLER, LEONARD PEARSON
118 Grays Ave., Glenolden, Pa.
V.M.D., University of Pennsylvania, 1938.
Vouchers: Bernard J. McGroarty and W. H. Paxson.
- DE VRIES, THEODORE M.
3400 Broad Ave., Altoona, Pa.
D.V.M., Kansas State College, 1930.
Vouchers: Eugene B. Ingmand and A. Henry Craige, Jr.
- DIX, RALPH M.
1107 Wheeling Ave., Cambridge, Ohio.
D.V.M., Ohio State University, 1911. Vouchers: W. F. Guard and J. C. Wickham.
- DORSETT, H. Q.
Rt. 6, Box 249, Birmingham, Ala.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and E. S. Winters.
- DOWDS, STANLEY JAMES
905 Thurston, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and G. R. Moore.
- DUNDAS, ROSS J.
Armstrong, Iowa.
D.V.M., Iowa State College, 1940.
Vouchers: C. H. Covault and Chas. Murray.
- ELLIS, ORIN
618 Fremont, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- ENGLISH, BURT WALTER
Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- ERICKSON, CARL FREDERICK
421 N. 16th, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- ESPY, KARL THOMAS
127 N. W. 23rd St., Oklahoma City, Okla.
D.V.M., Ohio State University, 1939.
Vouchers: S. R. Espy and S. E. Douglas.
- FANNING, JAMES J.
97 Haskell St., Beverly Farms, Mass.
B.V.Sc., Ontario Veterinary College, 1940.
Vouchers: R. A. McIntosh and A. F. Bain.
- FIRESTONE, MILTON W.
765 E. 163 St., New York, N. Y.
D.V.M., Ohio State University, 1938.
Vouchers: D. W. Ashcraft and Earl Baumwell.

FITCH, H. C.

Missouri Valley, Iowa.

D.V.M., Iowa State College, 1918.

Vouchers: Eugene B. Ingmand and A. H. Quin.

FLEENER, TRUMAN B.

5600 E. 11th, Tulsa, Okla.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and Stephen J. Roberts.

GILLET, FRANK G.

Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

GRAEFE, HENRY CLIFFORD

1014 Vattier St., Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

GRAY, HARRY MELVIN

Hampshire, Ill.

D.V.M., McMillip Veterinary College, 1917.

Vouchers: L. A. Merillat and Eugene B. Ingmand.

GREENBERG, MARK LEON

1234 Mechanic St., Camden, N. J.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

GREENSAPF, MURRAY

1645 Grand Concourse, Bronx, N. Y.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

HANSEN, FREDERIC W., JR.

Pelican Rapids, Minn.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

HEISE, REINHOLD W.

Emmetsburg, Iowa.

D.V.M., Iowa State College, 1917.

Vouchers: A. H. Quin and Eugene B. Ingmand.

HENSLEY, JOHN HERBERT

315 Seventh St., Colusa, Calif.

D.V.M., Kansas State College, 1934.

Vouchers: S. T. Michael and H. R. Groome.

HESS, ROY F.

Bagley, Iowa.

D.V.M., Iowa State College, 1923.

Vouchers: A. H. Quin and Eugene B. Ingmand.

HINES, G. H.

Hume, Ill.

D.V.M., Indiana Veterinary College, 1921.

Vouchers: L. A. Merillat and Eugene B. Ingmand.

HOFMANN, C. EDWIN

1012 Osage St., Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

HOUBRIGAN, JAMES LYNN

421 N. 16th St., Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and G. R. Moore.

HOWARD, ALVA L.

505 Northwestern Ave., Ames, Iowa.

D.V.M., Iowa State College, 1915.

Vouchers: Eugene B. Ingmand and A. H. Quin.

HOWARD, HORTON KENT

910 Moro St., Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

HOXEY, ROBERT J.

114 W. Washington St., Clarinda, Iowa.

D.V.M., Iowa State College, 1927.

Vouchers: Eugene B. Ingmand and A. H. Quin.

JABBS, THEODORE E.

710 Ogden Ave., Clearfield, Pa.

D.V.M., Cornell University, 1935.

Vouchers: Eugene B. Ingmand and A. Henry Craige, Jr.

JARVIS, M. K.

421 N. 16th St., Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

JEWELL, ROSS LYMAN

818 Bertrand, Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

JOHNSTON, JOE L.

Sylvester, Ga.

D.V.M., University of Georgia, 1927.

Vouchers: Chas. C. Rife and J. E. Severin.

JOHNSON, KENNETH L.

Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and G. R. Moore.

KAISER, JOSEPH M.

3123 Wesley Ave., Berwyn, Ill.

M.D.C., Chicago Veterinary College, 1904.

Vouchers: L. A. Merillat and Eugene B. Ingmand.

KENNEDY, CHESTER HENNESSY

921 Moro, Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

KENNEDY, FRANCIS MAXWELL

1329 Anderson, Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

KIMBALL, PERLE EVERETT

1311 Laramie, Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

KNOCHE, KARL

1329 Anderson, Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and R. R. Dykstra.

KRIG, HAROLD ANDERSON

RFD 1, Manhattan, Kan.

D.V.M., Kansas State College, 1940. Vouch-

ers: Edwin J. Frick and G. R. Moore.

Prepare to Visit the National Capital in August

- LANTZ, ROY A.**
Woodbine, Iowa.
D.V.M., Kansas City Veterinary College, 1913.
Vouchers: Eugene B. Ingmand and A. H. Quin.
- LATSHAW, CLIFTON**
149 E. Washington St., Shelbyville, Ind.
D.V.M., Ohio State University, 1929. Vouchers: J. C. Schoenlaub and Eugene B. Ingmand.
- LEACH, HERBERT E.**
Avoca, Iowa.
D.V.M., Chicago Veterinary College, 1919.
Vouchers: A. H. Quin and Eugene B. Ingmand.
- LEEFER, RUSSELL A.**
127 N. Kingston Rl., Plymouth, Ind.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- LENNON, THOMAS W., JR.**
Gladbach Apts., W. Magnolia St., Auburn, Ala.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.
- LOCKE, HARRY A.**
4215 Connecticut Ave., N. W., Washington, D. C.
D.V.M., George Washington University, 1912.
Vouchers: William M. Mohler and Alexander E. Wight.
- LOYD, PAUL T.**
Valley Center, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- MAC DONALD, ROBERT**
R. D. 1, Newburgh, N. Y.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- MAC LEOD, FORBES**
Dalkeith, Ontario.
B.V.Sc., Ontario Veterinary College, 1940.
Vouchers: A. F. Bain and Eugene B. Ingmand.
- McEWAN, HARRY F.**
215 Galena Blvd., Aurora, Ill.
B.V.Sc., Ontario Veterinary College, 1940.
D.V.M., Ohio State University, 1935. Vouchers: J. L. McEwan and Eugene B. Ingmand.
- MCGREGOR, ANGUS ROY JENNER**
221 Neil Ave., E. Kildonan, Winnipeg, Manitoba.
B.V.Sc., Ontario Veterinary College, 1940.
Vouchers: L. Stevenson and Victor R. Brown.
- MALNATI, JULIO JOHN**
1054 State Road, North Adams, Mass.
V.M.D., University of Pennsylvania, 1937.
Vouchers: Harrie W. Peirce and Frederick H. Schneider.
- MANINGER, WALTER F.**
1106 Kearney, Manhattan, Kan.
D.V.M., Kansas State College, 1940.
Vouchers: Edwin J. Frick and R. R. Dykstra.
- MAROLD, GORDON JOHN**
221 N. Delaware, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and G. R. Moore.
- MARTIN, JOHN GENTRY**
Gladbach Apts., W. Magnolia Ave., Auburn, Ala.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.
- MERRIMAN, ARTHUR KOHLER**
Sullivan, Ill.
D.V.M., Indiana Veterinary College, 1921.
Vouchers: L. A. Merillat and Eugene B. Ingmand.
- MESENBRINK, ROY LEONARD**
711 Osage, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and G. R. Moore.
- MISENER, ANDREW GRANT**
6448 N. Clark St., Chicago, Ill.
B.V.Sc., V.S., Ontario Veterinary College, 1938.
Vouchers: T. B. Crowe and L. A. Merillat.
- MITCHELL, ALBERT P.**
Osborne, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and G. R. Moore.
- MITCHELL, JOHN THOMAS**
State Serum Plant, Auburn, Ala.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.
- MOORE, CHARLES CARSON**
Louisburg, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- MOORE, PAUL M.**
1202 S. Washington St., Beeville, Texas.
D.V.M., Texas A & M College, 1938. Vouchers: J. Gilbert Horning and Eugene B. Ingmand.
- MURPHY, CLAUDE F.**
1716 Fairview, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and R. R. Dykstra.
- NELSON, ARTHUR EALTON**
Essex, Iowa.
D.V.M., St. Joseph Veterinary College, 1921;
B.S.A., Nebraska University. Vouchers: A. H. Quin and Eugene B. Ingmand.
- NELSON, JAMES M.**
Sigourney, Iowa.
D.V.M., Iowa State College, 1908. Vouchers: A. H. Quin and Eugene B. Ingmand.
- NEWCOMER, J. NELSON**
216 E. Main St., Mount Joy, Pa.
V.M.D., University of Pennsylvania, 1935.
Vouchers: E. W. Newcomer and H. W. Barnard.
- NOLLER, PAUL RICHARD**
Mankato, Kan.
D.V.M., Kansas State College, 1940. Vouchers: Edwin J. Frick and G. R. Moore.

NOWLEN, JAMES CLARE

123 Center Cross St., Sycamore, Ill.
D.V.M., Chicago Veterinary College, 1918.
Vouchers: L. A. Merrillat and Eugene B. Ingmand.

PERLEY, N. J.

Oakland, Iowa.
D.V.M., Iowa State College, 1938. Vouchers:
A. H. Quin and Eugene B. Ingmand.

PHILLIPS, PAUL EDWARD

1718 Fairview, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.

PHILLY, BUFORD DOYLE

108 N. 17th St., Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and Chas. H. Kitselman.

PRICE, SI ROY

427 S. Banker, Effingham, Ill.
M.D.C., Chicago Veterinary College, 1910.
Vouchers: L. A. Merrillat and Eugene B. Ingmand.

ROSENBAUM, NATHAN MATTHEW

25 Ashton Road, Yonkers, N. Y.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.

ROSENER, STEPHEN F.

8425 Gravois Ave., St. Louis, Mo.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and Stephen J. Roberts.

ROSENER, WILLIAM

721 Fremont St., Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.

SCHAFER, LEROY EDWARD

1214 Bluemont, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.

SCHLAEGEL, FRANCIS NOEL

Olsburg, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.

SCHWEIGER, VINCENT J.

1909 Anderson, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.

SHARTLE, CLARENCE F.

Stilesville, Ind.
V.M.D., Indiana Veterinary College, 1907.
Vouchers: J. C. Schoenlaub and Eugene B. Ingmand.

SHOEMAN, JOHN D.

Dallas Center, Iowa.
D.V.M., Kansas State College, 1928. Vouch-
ers: A. H. Quin and Eugene B. Ingmand.

SIMONSEN, EARL DEAN

101 E. Elm St., Cherokee, Iowa.
D.V.M., Iowa State College, 1940. Vouch-
ers: C. H. Covault and H. L. Foust.

SIMONSEN, DOYLE WARREN

Quimby, Iowa.
D.V.M., Iowa State College, 1940. Vouchers:
H. D. Bergman and Geo. R. Fowler.

SKALA, JOSEPH RUDOLPH

4732 W. North Ave., Chicago, Ill.
D.V.M., Ohio State University, 1932. Vouch-
ers: L. A. Merrillat and Eugene B. Ingmand.

SLAPPEY, WILLARD ORR

P. O. Box 95, Plains, Ga.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and L. A. Merrillat.

SMITH, G. T.

P. O. Box 276, Reinbeck, Iowa.
D.V.M., Kansas City Veterinary College, 1914.
Vouchers: A. H. Quin and Eugene B. Ing-
mand.

SMITH, WILLIAM CHESTER

Box 486, Auburn, Ala.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cot-
ton.

SMITH, WILLIAM EDGERLY

421 N. 16th St., Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.

SNIDER, CHARLES HENRY

616 Veronica, East St. Louis, Ill.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.

SPENCER, GUY ROGER

930 Bertrand St., Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and Lee M. Roderick.

STEELE, CARROLL CHESTER

Treynor, Iowa.
D.V.M., Chicago Veterinary College, 1914.
Vouchers: A. H. Quin and Eugene B. Ing-
mand.

STEELE, JOHN RICHARD

904 2nd Ave. S., Lethbridge, Alberta.
B.V.Sc., Ontario Veterinary College, 1940.
Vouchers: L. Stevenson and Victor R. Brown.

SWARTZ, RUSSELL PHILLIP

1000 Napa Road, Vallejo, Calif.
V.S., B.V.Sc., Ontario Veterinary College,
1925. Vouchers: W. L. Curtis and Eugene
C. Jones.

SWINDLE, B. CONWELL

209 W. Glenn Ave., Auburn, Ala.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and F. P. Woolf.

TABUSSO, MARINO EDMONDO

Casilla 1234, Lima, Peru, S. A.
D.V.M., University of Turin, 1901; B.Sc.,
University of Turin, 1898; M.D., University of
Turin, 1904; M.D., University of San
Marcos, 1911. Vouchers: James E. Mitchell
and Eugene B. Ingmand.

Prepare to Visit the National Capital in August

- TEMPERO, MORGAN W.
Veterinary Hospital, Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.
- THOMAS, KENNETH J.
235 Wonder St., Johnstown, Pa.
V.M.D., University of Pennsylvania, 1936.
Vouchers: E. T. Booth and F. E. Lentz.
- TRASKUS, ANTHONY DOMINIC
240 N. Main St., Pittston, Pa.
V.S., B.V.Sc., Ontario Veterinary College,
1938. Vouchers: Eugene B. Ingmand and
A. Henry Craige, Jr.
- TUCKER, JOSEPH
382 Edgewood Ave., N. E., Atlanta, Ga.
D.V.M., Veterinary College of Berlin, 1904.
Vouchers: Chas. C. Rife and J. E. Severin.
- TUTTLE, GEORGE D.
Garwin, Iowa.
M.D.C., Chicago Veterinary College, 1910.
Vouchers: A. H. Quin and Eugene B. Ing-
mand.
- VAN NESS, GLENN BENTON
Manhattan, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.
- VOLLBERG, HUGO FREDERICK
4304 Yuma St., N. W., Washington, D. C.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.
- WAY, EDWIN ELLSWORTH
1905 Moore St., Huntingdon, Pa.
V.M.D., University of Pennsylvania, 1934.
Vouchers: Eugene B. Ingmand and A. Henry
Craige, Jr.
- WHITEHAIR, CHARLES KENNETH
R. R. 1, Abilene, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.
- WILLIAMSON, JOHN WILLIAM
P. O. Box 71, Houston, Texas.
D.V.M., Texas A & M College, 1924. Vouch-
ers: J. Gilbert Horning and Eugene B. Ing-
mand.
- WIRE, DONALD A.
418 S. Howes St., Fort Collins, Colo.
D.V.M., Colorado State College, 1940. Vouch-
ers: James Farquharson and Frank Thorp,
Jr.
- WISE, THOMAS MURRAY
Sumter, Ga.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and W. E. Cotton.
- WITT, LEONARD CHARLES
Box 368, Scribner, Neb.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.
- WITTEN, JOE M.
2051 College St., Jacksonville, Fla.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: R. L. Mundhenk and M. W. Wil-
liams.
- WOODARD, ISAAC E.
Box 374, Natchitoches, La.
D.V.M., Arkansas Veterinary College, 1920.
Vouchers: W. T. Oglesby and Eugene B.
Ingmand.
- YOKUM, DALE J.
312 W. Madison, Iola, Kan.
D.V.M., Kansas State College, 1940. Vouch-
ers: Edwin J. Frick and R. R. Dykstra.
- YOUNG, TYLER J.
769 Vance Ave., Memphis, Tenn.
D.V.M., Alabama Polytechnic Institute, 1940;
B.S., Virginia Polytechnic Institute, 1934;
M.S., Virginia Polytechnic Institute, 1938.
Vouchers: L. E. Starr and John H. Gill-
mann.

Second Listing

- Abell, Guy F., Rome, Pa.
Anderson, Frank Albert, 155 W. Grand Ave.,
Chicago, Ill.
Andress, Walter Millard, 4th and King Sts.,
Lewes, Del.
Bayard, Richard S., New Milford, Conn.
Briggs, Ralph Corey, Webster St., No. Hanover,
Mass.
Cashell, Irving Gering, 2807 18th St., N.W.,
Washington, D. C.
Caughman, Jr., Frederick Porter, 900 Harden
St., Columbia, S. Car.
Cox, N. A., Box 1101, Lubbock, Texas.
Cullison, James M., Charleston Veterinary Hos-
pital, Charleston, Mo.
Dean, Eward Arthur, 3121 S. Sherman St.,
Englewood, Colo.
Dennewitz, Homer Arresta, 4615 41st St., N.W.,
Washington, D. C.
Dillon, Hugh C., Marion Junction, Ala.
Fasken, J. W., 533 Doreen St., Winnipeg, Mani-
toba.
Fisher, Samuel S., 507 Federal Bldg., Little
Rock, Ark.
Foy, Gordon L., 932 E. Hyde Park Ave., St.
Joseph, Mo.
Garrett, La Rua, Tuscaloosa, Ala.
Higgins, William Young, 46 Park Ave., Flem-
ington, N. J.
Isbell, W. J., Auburn, Ala.
Jerome, Norman, Box 631, Route 2, San Diego,
Calif.
Johnson, Sanford E., 3030 Newport St., Omaha,
Neb.
Jones, William Edward, 409 P. O. Bldg., Mont-
gomery, Ala.
Kearley, Richard I., Andalusia, Ala.
Kendrick, Leon Ryan, 205 Circle Ave., Char-
lotte, N. Car.

Koch, Meyer, General Delivery, Tuscaloosa, Ala.
 Macasaet, Valentin, Canlubang, Laguna, P. I.
 Meadows, Marion E., Phenix City, Ala.
 Meredith, Clarence Paul, 705 Main, Joplin, Mo.
 Nash, John G. C., 211 N. A. St., Oskaloosa, Iowa.
 O'Brien, James H., 96 Summer St., Taunton, Mass.

Outwater, George Elwood, 183 W. Thames St., Norwich, Conn.

Phelps, Guy Julius, 108 N. Lawrence St., Montgomery, Ala.

Pinkerton, Harry Edgar, 1519 Third Ave. North, Fort Dodge, Iowa.

Platt, William Barry, Wharton Ave., Somerville, N. J.

Ranney, Clarence L., 2456 Heliotrope Drive, Santa Ana, Calif.

Rossman, Lewis C., Pelham, Ga.

Schmidt, Martin George, Box 42, Falmouth, Ky.

Sender, Ludwig, c/o Fort Dodge Serum Co., Fort Dodge, Iowa.

Shaw, W. Sumner, Millbrook, N. Y.

Suebsaeng, Charas, 2300 Kalorama Road, N.W., Washington, D. C.

Tanner, Hal W., Eutlaw, Ala.

Tolley, Archie D., 1501 S. Nevada Ave., Colorado Springs, Colo.

White, Kenneth A., Deary, Idaho.

The compensation offered is £300 (\$1,200 at the current exchange rate) per year to be paid by the Bahamas Humane Society, plus £100 (\$400) to be paid by the Bahamas government for supervision of the market slaughter house. Time necessarily occupied would be at least two hours daily of free clinic at the Humane Society's headquarters and parts of two mornings each week at the slaughter house. Offices and medicines are furnished at the free clinic.

The veterinarian would be allowed to conduct a private practice during the rest of the time. This should be reasonably substantial during the busy winter season, but light in summer. Free transportation to Nassau will be furnished. The veterinarian would need an automobile, to be owned and operated at his expense. If necessary, modest living quarters may be provided on the Humane Society's grounds.

A young American filled the position to the satisfaction of everyone, but he married and was obliged to resign because his income was insufficient for the support of two persons.

Applicants should address: Miss Dora Langton-Jones, c/o Bahamas Humane Society, Nassau, Bahamas.

Sir Patrick Laidlaw Is Dead

Sir Patrick Laidlaw of London, England, known throughout the world for his outstanding work on canine distemper and the human influenza virus, died suddenly at his home on March 19.

Veterinarian Needed in Nassau

The American consul at Nassau, N. P., Bahamas, in a communication to the state department, has reported the need of a veterinarian in Nassau.

STUDENT CHAPTER ACTIVITIES

Iowa State College

At a meeting of the Iowa State chapter on March 27, L. R. Fairall of the Fairall and Company advertising agency, was the guest speaker.

At the meeting of April 10, four reels of films were shown on the causes and treatment of sterility and other disorders of the reproductive organs of mares and cows.

Bill Knoop was elected as the Cardinal Guild



GRADUATING SENIORS OF KANSAS STATE COLLEGE

The graduating seniors of Kansas State College have all made application for membership.

representative from the veterinary division, to hold office next year.

WALTER TIMMS, *Secretary*.

Kansas State College

The graduating seniors of Kansas State College are 100 per cent A.V.M.A. members! (See group picture on preceding page.)

On March 19, R. L. Anderes of Kansas City, Mo., addressed the chapter on "Artificial Insemination in the Bovine," and illustrated his talk with colored motion pictures.

On April 2, E. E. Leasure, professor of anatomy and physiology at the College, gave illustrated lectures on "Allergic Dermatitis in the Bovine" and "Encephalomyelitis in the Equine Species."

CLIFFORD A. LEMEN, *Secretary*.

Cornell University

Dr. and Mrs. Cassius Way were guests at the recent Honor Day exercises of the New York State Veterinary College. The annual banquet of the chapter was held in conjunction with this event, with an attendance of 249. This was followed by a dance which was attended by a large number of the students. The party was a success from every standpoint, and it undoubtedly will become an annual custom.

University of Pennsylvania

On October 17, 1939, an informal smoker was given in honor of the freshman class. The purpose of this affair was to familiarize the freshmen with the activities of the chapter. John G. Hardenbergh of Plainsboro, N. J., was one of the guest speakers. Dean G. A. Dick and several other faculty members also addressed the chapter.

M. A. Emmerson was elected honorary president, succeeding the late C. J. Marshall.

The chapter contributed liberally to the Clarence J. Marshall Memorial Library Fund, which will provide the School of Veterinary Medicine with the most modern of library facilities. Three operating tables and instrument cabinets were presented by the chapter to the veterinary school for use by seniors in the course on small animal surgery.

Coöperating with the executive office of the A.V.M.A. in its plan to correlate and unify the activities of the various chapters, the Pennsylvania chapter voted to replace its former charter, constitution and by-laws, diploma, and key with those standardized by the Association.

The program for each regular meeting consists of an address by a guest and by a senior student. Guest speakers and their subjects were: W. G. Love of the University of Pennsylvania, "Periodic Ophthalmia"; J. D. Gadd of Towson, Md., "Aseptic Surgery in Small Animal Practice"; L. R. Barto of Basking

Ridge, N. J., "Travels in Europe" (motion pictures); J. F. Shigley of Pennsylvania State College, "Travels Through the United States and Canada"; M. A. Emmerson of the University of Pennsylvania, "X-Ray Therapy in Animals"; Alan Bachrach of Philadelphia, Pa., "Demonstration and Discussion of Endoscopy"; Otto Stader of Ardmore, Pa., "Demonstration and Discussion of the Stader Splint"; and E. C. Deubler of Newton, Pa., "Sterility in Cattle."

Senior student speakers and their subjects were: H. E. Schaden, "Urinary Calculi"; E. B. Miller, "Eczema in the Dog"; H. J. Jenne, "The Ophthalmoscopic Examination of the Horse's Eye"; R. B. Church, "Nephritis"; G. F. Priest, "Caponizing of the Cockerel"; Miss G. G. Bodine, "Post-Operative Care of Animals"; and G. E. Wortman, "Bovine Trichomoniasis, Its Diagnosis and Control."

The present officers of the chapter are: R. B. Church, president; H. E. Schaden, vice-president; Elizabeth J. Collins, recording secretary; J. K. Shrader, financial secretary; G. H. Fouse, treasurer; J. R. Wiley, librarian; G. F. Priest, senior representative; K. H. Martin, junior representative; T. E. Willis, sophomore representative; and T. DeMott, freshman representative.

ELIZABETH J. COLLINS,
Recording Secretary.

U. S. GOVERNMENT

B.A.I. Transfers

Charles Barnes from St. Louis, Mo., to Pittsburgh, Pa., on meat inspection.

Lewis Bilikam from Honolulu, Hawaii, to Phoenix, Ariz., in charge of meat inspection and field inspection.

Fred E. Davis from Washington, D. C., to Baltimore, Md., on meat inspection.

George H. Ehlers from Omaha, Neb., to Salt Lake City, Utah.

Charles Hackenberg, Jr., from Newark, N. J., to New York, N. Y., on meat inspection.

Charles Parrish from Richmond, Va., to Raleigh, N. Car., on Bang's disease.

Ralph A. Parsons from Portland, Ore., to Honolulu, Hawaii, on meat inspection, field inspection and tuberculosis eradication.

Morris Pollard from Richmond, Va., to Beltsville, Md.

Jerome H. Reisman from Harrisburg, Pa., to New York, N. Y., on meat inspection.

Donald E. Rodabaugh from Jefferson City, Mo., to Jacksonville, Fla., on Bang's disease.

Israel M. Saturen from New York, N. Y., to Harrisburg, Pa., on Bang's disease.

Howard E. Smith from Beltsville, Md., to Richmond, Va., on meat inspection.

George G. Tanenbaum from Albert Lea,

Minn., to Fort Dodge, Iowa, on meat inspection.

Archie R. Zumwalt from Phoenix, Ariz., to San Diego, Calif., in charge of meat inspection, tuberculosis eradication and field inspection.

Retirements.—Lynnford C. Butterfield, San Diego, Calif.; Byron S. Shattuck, Buffalo, N. Y.

Death.—Warde F. Meyer, Portland, Ore., died March 26, 1940, in an automobile accident.

Regular Army

The following veterinary reserve officers have been ordered to active duty and assigned to stations indicated after their names, for a period of one year, under the provisions of Public, No. 415, 76th Congress:

1st Lt. Ben N. Winchester, Headquarters, Third Corps Area, Baltimore, Md.

1st Lt. Warren L. Skinner, Fort McClellan, Ala.

1st Lt. Olin A. Anderson, Presidio of San Francisco, Calif.

1st Lt. James D. Ramsey, Camp Jackson, S. Car.

1st Lt. Lloyd D. Jones, Fort Sheridan, Ill.

1st Lt. Harry R. Lancaster, Fort Sam Houston, Texas.

Capt. Russel J. Stewart, Fort Sill, Okla.

1st Lt. Walter A. Anderson, Fort Lewis, Wash.

Captain John H. Rust III is relieved from assignment and station at the Presidio of San Francisco, Calif., and from observation and treatment at Letterman General Hospital, Presidio of San Francisco, Calif., is assigned to station at the Seattle quartermaster depot, Seattle, Wash., and will report to the commanding officer, San Francisco Port of Embarkation, Fort Mason, Calif., for temporary duty for a period of approximately four months and, upon completion, will proceed to Seattle, Wash., and report for duty.

Captain Ralph W. Mohri is relieved from his present assignment and duty at the Army Medical Center, Washington, D. C., effective at such time as will enable him to proceed to New York, N. Y., and sail on transport scheduled to leave that port on or about June 18, 1940, for the Panama Canal department and, upon arrival, will report to the commanding general for assignment to duty with the veterinary corps.

Lt. Colonel Floyd C. Sager is assigned to duty at Fort Robinson, Neb., effective upon completion of his present tour of foreign service in the Philippine department.

Lt. Colonel William R. Wolfe is relieved from duty at Fort Robinson, Neb., effective upon arrival of Lt. Colonel Floyd C. Sager, and assigned to duty at Fort Oglethorpe, Ga.

Announcement is made of the promotion of 1st Lt. Karl H. Willers to the grade of captain, with rank from March 9, 1940.

Veterinary Corps Reserve

NEW ACCEPTANCES—FIRST LIEUTENANTS

Frank Fisherman, Big Spring, Texas.

Harold Albert Servais, RFD No. 6, Bridge-ton, N. J.

Wm. Jasper Snodderly, 3117 N. W. 13th St., Oklahoma City, Okla.

PROMOTIONS

To Captain.—Weldon Morris Couch, 742 E. Coronado Road, Phoenix, Ariz.; Howard Luther Kester, Cambridge, Neb.

To Lt. Colonel.—Paul Cox Kucher, Reckeweg Road, Fort Wayne, Ind.

To Major.—James Carlton McGrath, CCC Headquarters, Colorado-Wyoming District, Littleton, Colo.

AMONG THE STATES

Arkansas

The Arkansas Veterinary Medical Association held its 24th annual meeting at the Eastman Hotel in Hot Springs, March 21-22, with 57 veterinarians in attendance.

Out-of-state speakers were J. R. Ketchersid of Texas A & M College, College Station, Texas; John H. Gillmann of Memphis, Tenn.; H. C. Rinehart of Springfield, Ill.; Eugene B. Ingmand of Chicago, Ill.; and R. L. Anderes of Kansas City, Mo. Two films, "Reproductive Disorders in Cows and Horses" and "Artificial Insemination," were shown during the meeting.

"Modification of Interstate Regulations" was discussed at considerable length by C. D. Stubbs, state veterinarian of Arkansas, and H. C. Rinehart, state veterinarian of Illinois. Wilbur McPherson and Allen W. Rice of the federal bureau of animal industry at Little Rock presented "Development of Live Stock in Arkansas."

Sessions were adjourned at 2:00 p. m. on both days so that the visitors might attend the horse races at Oaklawn Park.

The following men were elected by unanimous vote to serve in office during the ensuing year: Lee T. Railsback of Harrison, president; Fred Thompson of Little Rock, first vice-president; D. F. Eveleth of Fayetteville, second vice-president; and F. O. Garrett of Dumas, secretary-treasurer. C. D. Stubbs of Little Rock was reelected delegate to the House of Representatives of the national association, with R. W. Williams of El Dorado as his alternate.

F. O. GARRETT, *Secretary.*

California

With a total registration of 251, the seventh annual convention of the American Animal Hospital Association was held from March 27

to 30 in the Hollywood-Roosevelt Hotel, Hollywood, Calif. Louis H. LaFond of Detroit, Mich., presided at the opening session and gave the presidential address. Next, S. W. Haigler of St. Louis, Mo., presented "Progress Made by the American Animal Hospital Association." Dr. Haigler gave a résumé of accomplishments in the six years of the Association, emphasizing the increased efficiency of small animal hospitals. "Ten years ago many dog owners were skeptical regarding hospitalization of their pets," he declared. This situation has been changed to a large extent today, he added, because of the great improvement in the hospitals.

New officers of the Association for the ensuing year, elected at the noon business session, are: President, D. A. Eastman, Miami, Fla.; first vice-president, Joe Engle, Summit, N. J.; second vice-president, Joseph D. Cozens, Los Angeles, Calif.; secretary, J. V. Lacroix, Evanston, Ill.; treasurer, A. R. Theobald, Cincinnati, Ohio; member of the Executive Board, S. W. Haigler, St. Louis, Mo.

The first paper given at the afternoon session was entitled, "X-Ray Therapy in Veterinary Practice," by Myron A. Thom of Pasadena and Donald Laing, M.D., of Pasadena. Dr. Laing reported that pneumonia can be handled successfully by x-ray therapy. He likewise reported that about 95 per cent of acute tonsillitis cases in children reacted favorably to x-ray therapy. Dr. Laing further reported successful treatment of rhinitis in humans with x-ray therapy and stated that the same good results could be obtained in treating dogs with chronic nasal discharges. Inflammation of the prostate gland also responds favorably to x-ray therapy, he said.

T. A. Detienne of Pasadena, a lady veterinarian, gave a paper entitled, "Diseases and Hospitalization of Cats." The speaker divided her discussion into three main topics—specific enteritis, abdominal distemper and coccidiosis. Dr. Detienne said that if the temperature is 105° F. or above when a case of specific enteritis is presented and if it is treated with feline homologous serum, one may expect about 95 per cent favorable results. Internally she recommended 2.5 gr. of sulfanilamide every four hours. If the temperature is above 103° on the second day, the dose of serum should be repeated. However, if the temperature is below 103° on the second day, the prognosis is considered grave and generally no treatment will save the patient. She believes that if a case has a temperature of 104° or below, serum is of little value, as the result would probably be unsatisfactory. It had been her experience to get these cases with very little diarrhea, some vomiting, high fever and, later, collapse. In intestinal distemper, however, she found that nearly every case presented had a bloody, watery diarrhea

and a temperature ranging from 102° to 104° and that the patient had been sick for three days to a week. Dr. Detienne thinks that feline homologous enteritis serum is moderately effective in abdominal distemper in cats, but it should be used as early as possible. Dehydration is common and should be controlled with normal saline injections. She also mentioned tapeworms, for which she is using nemural, and subcutaneous and deep abscesses, for which she uses urea jelly (30 to 50 per cent) or stock bacterins.

Carl F. Schlotthauer of The Mayo Foundation, Rochester, Minn., next presented an illustrated lecture on the subject, "The Incidence and Pathology of Various Lesions of the Nervous System in Dogs."

Dr. Schlotthauer later presented a paper on "Neoplasms of the Mammary Glands in Dogs." Among the causes of neoplasms of the mammary glands, Dr. Schlotthauer listed mastitis. "This does not necessarily hold true in cows, however," said Dr. Schlotthauer. "There is evidently a relation between the ovary and the development of tumors of the mammary glands." Due to the fact that there is a direct relation of the lymph drainage of the three anterior mammary glands and the two posterior mammary glands, Dr. Schlotthauer advised that when there is a tumor on any one of the first three anterior mammary glands of the dog, all three of the glands should be removed so that the tumor will not spread. Likewise, if the tumor is located in either of the posterior two glands, they should be removed. This applies only unilaterally.

"Heartworm and Other Parasitic Diseases of Dogs" was the next subject, discussed by Lloyd C. Moss of Honolulu, Hawaii. This also was an illustrated lecture. Dr. Moss related that heartworm disease is common in Hawaii, as well as other parasitic diseases in dogs. He stated that the veterinarians of Hawaii do not do any home treating for intestinal parasites. Most of the dogs are hospitalized for two to seven days. Coccidiosis is common. Vomiting had been noted as a frequent symptom of this disease. Control of conditions is enhanced if the dog yards are washed with 4 oz. of lye dissolved in one gallon of water.

C. P. Zepp of New York City presented an illustrated lecture, using colored charts, on the subject, "Perineal Hernia and the Carabba Operation." Dr. Zepp reviewed the technic of Dr. Carabba, a New York medical surgeon.

E. B. Dibbell of Baltimore, Md., conducted a round-table discussion of clinical procedures. It was brought out in Dr. Dibbell's discussion that many have been using sulfanilamide powder locally in different types of infection, particularly otitis. Cats seem to tolerate sulfanilamide locally very well, par-

ticularly when it is packed on a wound and a bandage applied. One member reported using sulfanilamide and cod liver oil as a paste for injection into the ear. Others reported using the drug in compound fractures with excellent results. The use of a 10 to 20 per cent saline solution intravenously for toxemias was suggested. It was thought to be contraindicated by several, unless diuresis is desired. Blood for therapeutic purposes was thoroughly discussed. Dr. Schlotthauer reported that Dr. Mann of The Mayo Foundation says, "Typing of dog blood is not necessary." Of all of the transfusions that have been given at The Mayo Foundation there has been no reaction from using any dog's blood. Dr. Schlotthauer also stated that their technic consists of using the jugular vein to draw blood from the donor into a dry 50-cc. syringe and injecting it directly into the patient. No citrate solution is used.

Many were of the opinion that whole blood is of great value to young dogs that are highly infested with hookworms. Many of the members have been using blood banks. None recommended that the blood be kept longer than two weeks at 40° F. Blood transfusions are given before treating for hookworms, with good success. It was recommended that the blood be centrifuged and the serum collected, and one tenth of 1 per cent of tri-cresol be added as a preservative. It was said that such serum can be kept in a refrigerator for at least six months, and probably longer. The speaker stated that he uses serum of this kind taken from dogs which have had free access to the hospital and the usual run of hospital infections to treat various types of bacterial infections. He is of the opinion that good results may be expected from this therapy.

Several members reported the use of oxalic acid (1 mg. per cc.) to control hemorrhage. Dr. Anderson of Los Angeles reported that he had been using it for several months, giving a dosage of 5 to 25 cc.

The public health aspects of canine leptospirosis was the subject discussed by Karl F. Meyer, director of the George Williams Hooper Foundation, University of California, San Francisco. Dr. Meyer is of the opinion that many dogs may have leptospirosis without showing clinical symptoms. In other words, infection is passed unnoticed and it is not until symptoms begin to arise from the damaged kidneys that the animal is brought to a veterinarian. Dr. Meyer stated that, unfortunately, there is no therapeutic treatment of much value except sera. He does believe, however, that vaccine therapy may be developed within the near future. It is already being used in humans with a great deal of

success. For treatment, Dr. Meyer recommends that glucose and saline solutions be given intravenously in large doses along with heart stimulants. If serum is used, he thinks that only large doses are beneficial. Dr. Meyer advised that the veterinarian should guard against returning a dog that has been suffering with leptospirosis to its owner, until he is sure that the patient is entirely free from the organism. The urine should be examined daily for the presence of the organism; after the urine becomes negative one may feel safe in releasing the patient. As a prophylactic measure, Dr. Meyer recommended acidifying the urine. Since the organism does not live in acid urine, he considers it quite essential that the dog be fed on a meat diet. If necessary, hydrochloric acid may be given in the drinking water to produce an acid urine. A further measure of prevention is to keep all rats away from the hospital. Do not trap them but kill them and make the hospital rat-proof. Of course, it is necessary to keep the premises strictly clean, as filth will draw rats.

All animals with leptospirosis that are hospitalized should be strictly isolated at all times. After the patient is discharged, the cage where it has been must be thoroughly cleaned. For cleaning cages, Dr. Meyer recommends a hypochlorite solution of 1 to 50. He also recommends that veterinarians and attendants handling dogs with leptospirosis wear rubber gloves, and if they have wounds on their hands, they should be treated with iodine. Dr. Meyer stated that it has been demonstrated that the organism can penetrate the unbroken skin. He said that the onset of this disease is sudden. The animal is acutely sick with a high fever. Fifty to 60 per cent do not show jaundice.

Joseph B. Engle of Summit, N. J., and J. Stuart Crawford of Far Rockaway, N. Y., presented a paper on "Pyometra." In many cases, animals suffering with this disease show no elevation of temperature. The authors are of the opinion that many cases of pyometra result from chronic metritis. They stated that it is often seen after irregular estrual periods. Pyometra generally develops in one to three weeks following the estrual period. For treatment, Drs. Engle and Crawford recommend surgery. Diathermy is dangerous, Dr. Engle said, unless the cervix is open.

"Endocrinological Problems" was the subject discussed by George H. Hart of the University of California at Davis. Dr. Hart handled this subject in a thorough and practical manner.

Meridian R. Greene of the department of bacteriology, University of California, Los An-

Prepare to Visit the National Capital in August

geles, presented a discussion on leptospirosis in southern California. One observation made by Dr. Greene was that leptospirosis affected males much more often than females; in fact, the ratio was approximately 1 to 10. She said that about 20 per cent of the dogs in southern California have had actual contact with the disease. As one of the symptoms, Dr. Greene finds that the urine is generally quite alkaline. "The agglutination test is valuable in arriving at a diagnosis," said Dr. Greene. They are doing this work at the University of California and would be glad to assist veterinarians who wish to send in blood samples from suspected animals.

Agnes Fay Morgan, director of the department of nutrition at the University of California, Los Angeles, discussed "Deficiencies and Fallacies in Canine Diet."

There were about 50 ladies present, who were entertained by the local committee.

Charles W. Bower of Topeka, Kan., who is a member of the A.A.H.A. committee on foods, reported a basic change in the policy on dog-food testing which will benefit dog-food manufacturers who retain independent laboratories for food tests. Hereafter, the committee on foods will accept for consideration the results obtained by independent laboratories, not associated with the manufacturer, on market samples of dog foods.

Dr. Bower, in his report, declared that the new plan of dog-food testing makes it possible for a dog-food manufacturer to assemble and submit to the committee and scientific council the results of tests by independent laboratories on market samples.

"The manufacturer, however, will be required to execute the same agreement as is now in force," Dr. Bower said. "Should the data submitted be considered adequate by the council and committee, a seal of approval will be issued under the terms of the contract."

"It is the desire of those associated with this program that, by making possible this opportunity, the best interests of the program will be furthered and, at the same time, credit may be allowed for scientifically sound work already conducted."

"The plan will not eliminate the chemical and biological tests now being conducted under the direction of the committee on foods but could take the place of those tests in the case of certain products. If the food is accepted for a seal, it will be subject to an annual retest at the direction of the committee on foods."

Dr. Bower asserted that this change in policy will benefit not only dog-food manufacturers, but also dog owners who wish to be certain that their pets receive nutritionally adequate foods by buying only food bearing the seal of approval.

Dominican Republic

G. A. Roberts of Ciudad Trujillo writes: "Many cases reported as rabies in dogs here have been proved to be due to heartworms."

Georgia

The Atlanta city council recently revised the regulations governing the production and sale of milk. Producers are given three years to get their herds on a Bang's disease-tuberculosis-free basis and at the end of this period more stringent regulations will go into effect. Dairy inspectors are to be placed under Civil Service control.

Idaho

This spring horse owners of the state have shown considerable interest in vaccination against equine encephalomyelitis. Fees are \$2.00 and up, depending upon the number of animals treated.

Illinois

The extension department and the department of animal pathology and hygiene, University of Illinois, Urbana, have been conducting several schools on poultry practice in different parts of the state, sponsored by local and sectional associations. These schools are open to all veterinarians. From the records of attendance, it would appear that Illinois veterinarians are becoming interested in poultry practice.

Indiana

A regular meeting of the Tenth District Veterinary Medical Association was held on April 18 at Muncie, H. M. Hamilton acting as host. Thirty-nine veterinarians and ladies attended.

J. J. Arnold of Newcastle spoke on the uses of sulfanilamide and J. L. Axby of Indianapolis led an interesting discussion of present and proposed Bang's disease legislation.

J. J. ARNOLD, *Secretary*.

Iowa

More than 100 veterinarians and ladies attended the April 2 meeting of the Southwestern Iowa association at Council Bluffs. Due to the carefully planned program, arranged by Secretary Geo. Hawthorne of Clarinda and his committee, it was possible to present 15 speakers on a wide variety of practical subjects. Nine of the members joined the A.V. M.A. as the result of a well-outlined discussion of the national association's activities by Eugene B. Ingmand, assistant executive secretary.

Hon. Mark Thornburg, Iowa secretary of agriculture, presided at the banquet and Lieutenant-General Mathew A. Tinley of Council

Bluffs, famous soldier, physician and civic leader, was the principal speaker.

Ladies attending the meeting enjoyed a tea at the spacious home of Mrs. J. A. Lueth, wife of the association's president.

A. H. QUIN, *Resident Sec'y.*

Michigan

Effective April 1, 1940, 47 counties in southern Michigan are under quarantine in an effort to reduce the incidence of rabies within the area. Rabies in animals has been detected in 39 of the 47 counties in the quarantined area. In 1939, the state health department laboratory produced 65,000 single doses of rabies vaccines for human use. It is hoped that the quarantine measures will be sufficiently effective to permit the lifting of the quarantine by the latter part of the summer so that hunting dogs may be trained.

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The veterinary school of the University of Mexico has presented an honorary degree, "Professor Extraordinario de la Facultad de Medicina Veterinaria," to I. Forest Huddleson of Michigan State College, East Lansing, in recognition of his outstanding contributions to veterinary science. Fernando Camargo, D. V. M., of the University made a special trip to the United States a few weeks ago to confer this honor upon Dr. Huddleson.

Minnesota

The January meeting of the Minnesota Pathological Society was given over to a symposium on encephalitis. R. Fenstermacher of the division of veterinary medicine, University Farm, St. Paul, discussed the subject of equine encephalomyelitis and told of its occurrence in the state. His remarks were supplemented by lantern slides and motion pictures, and his presentation brought forth many questions from physicians in attendance.

Missouri

A group of practicing veterinarians from 18 states gathered in Kansas City, March 14-15, and formed the American Society of Veterinary Therapy.

The object of this new organization is to deal with both local and national problems confronting practitioners. This they expect to accomplish by coördinating the efforts of veterinary associations throughout the United States and centering them in the A.V.M.A.

The Society adopted a constitution and by-laws and set the annual dues at \$5.00. It is expected that all of the practitioners in the United States eventually will join the organization. Those desiring to affiliate should communicate with the secretary. Following are the officers: President, H. W. Young of Kansas City, Mo.; first vice-president, Geo. A. Hawthorne of Clarinda, Iowa; second vice-

president, Rease Mitcham of Little Rock, Ark.; and, secretary-treasurer, J. C. Flynn of Kansas City, Mo. The Executive Board comprises S. L. Stewart of Olathe, Kan.; S. R. Espy of Oklahoma City, Okla.; Madero N. Bader of Galveston, Texas; L. A. Tischhauser of Garavilla, Iowa; and F. H. Suits of Odessa, Mo.

Montana

Under the laws of Montana the production and distribution of milk and cream comes under the jurisdiction of the veterinary profession. The Montana Livestock Sanitary Board promulgates all definitions and regulations governing the inspection of dairies, milk plants, condensed-milk factories, powdered-milk factories, and standards for milk and milk products sold or distributed within the state.

When the Montana milk control board was created, the legislature provided by an official act that the executive officer of the Montana Livestock Sanitary Board should be chairman *ex-officio* of the milk control board. This board may designate the minimum price for milk in trade and market areas but has no jurisdiction over the production or the distribution of milk and cream or sanitary standards for dairies.

The law conferring authority on the state livestock sanitary board to govern the production and distribution of milk has been in effect since 1921.

W. J. BUTLER, *Resident Sec'y.*

New Jersey

At a well-attended meeting of the Trent Veterinary Medical Association on March 21, Ralph B. Little of the Rockefeller Institute for Medical Research at Princeton spoke on encephalitis in cows caused by the *Listerella* organism. Amos Stults exhibited a splint he has devised for setting fractures of the legs in large animals and he presented a paper on casting and fixation of the limbs. P. B. Sylvester spoke on present-day means of diagnosis as compared with earlier methods.

J. R. PORTEUS, *Resident Sec'y.*

New York

The medical and public health exhibits at the New York World's Fair, which were attended by 7½ million visitors in 1939, will be reopened for the 1940 season on May 11, with the A.V.M.A. exhibit again occupying a prominent position in the setting.

North Carolina

Mastitis and breeding-trouble clinics were held during the weeks of March 25 and April 1 at state institutions in Morgantown, Concord, Greensboro, Raleigh and Kinston. Examinations were made of 344 cattle at the five clinics conducted in this period. The com-

bined attendance was 61. The breeding-trouble clinic was in charge of W. A. Hornaday of Greensboro and the mastitis clinic was supervised by M. M. Leonard of Asheville.

Pennsylvania

On the invitation of John D. Beck, professor of veterinary medicine at the University of Pennsylvania, Maude E. Abbott visited the veterinary school and conducted a clinic on heart cases, April 2. Dr. Abbott, curator of the Historical Medical Museum and assistant professor of medical research at McGill University, Montreal, is generally regarded as the world's leading authority on congenital heart disease. She is the writer of "Atlas of Congenital Cardiac Disease."

One of the most interesting subjects examined during this clinic was a calf suffering with a condition diagnosed as tetralogy of Fallot—a congenital pulmonary stenosis, with septal defect, dextro position of the aorta and hypertrophy of the right ventricle.

Dr. Beck is collaborating with Martin Wendkos of the medical faculty in a study of cardiac cases among lower animals.

A. HENRY CRAIG, JR., *Resident Sec'y.*

West Virginia

Rabies is still prevalent in several counties of the state. One farmer lost four head of cattle within 39 days and all of the deaths were traced directly to one rabid dog.

COMING MEETINGS

New York City, Veterinary Medical Association of. Hotel New Yorker, New York, N. Y. May 1, 1940. J. J. Merenda, secretary, 136 W. 53rd St., New York, N. Y.

Dallas-Fort Worth Veterinary Medical Society. Fort Worth, Texas. May 2, 1940. R. L. Rogers, Jr., secretary, Route 2, Gordon, Texas.

Houston Veterinary Association. Houston, Texas. May 2, 1940. W. T. Hufnall, secretary, 1612-14 E. Alabama Ave., Houston, Texas.

St. Louis District Veterinary Medical Association. Melbourne Hotel, St. Louis, Mo. May 3, 1940. J. P. Torrey, secretary, 610 Veronica Ave., East St. Louis, Ill.

Small Animal Hospital Association. Los Angeles, Calif. May 7, 1940. R. W. Gerry, secretary, 8474 Melrose Ave., Los Angeles, Calif.

Southeastern Michigan Veterinary Medical Association. Medical Arts Bldg., 3919 John R St., Detroit, Mich. May 8, 1940. F. D. Egan,

secretary, 17422 Woodward Ave., Detroit, Mich.

Willamette Valley Veterinary Medical Association. Albany, Ore. May 8, 1940. T. Robert Phelps, secretary, 1514 Washington St., Oregon City, Ore.

American Scientific Congress. Washington, D. C. May 10-16, 1940. (A.V.M.A. special committee to represent veterinary profession of United States: Col. R. A. Kelsner, John R. Mohler and Willard H. Wright.)

Ak-Sar-Ben Veterinary Medical Association. Fontenelle Hotel, Omaha, Neb. May 13, 1940. J. D. Ray, secretary, 1124 Harney St., Omaha, Neb.

Chicago Veterinary Medical Association. Hotel Sherman, Chicago, Ill. May 14, 1940. G. S. Elwood, secretary, 5449 Broadway, Chicago, Ill.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. May 15, 1940. Charles Eastman, secretary, 725 S. Vancouver Ave., Los Angeles, Calif.

Bexar County, The Veterinary Medical Association of. Gunter Hotel, San Antonio, Texas. May 16, 1940. W. A. Lawrence, secretary, 3231 W. French Pl., San Antonio, Texas.

Connecticut Veterinary Medical Association. Sage Park Race Track, Windsor, Conn. May 16, 1940. Geo. E. Corwin, secretary, State Office Bldg., Hartford, Conn.

Kansas City Veterinary Medical Association. Kansas City, Mo. May 20, 1940. S. J. Schilling, secretary, Box 167, Kansas City, Mo.

San Diego County Veterinary Medical Association. Zoölogical Research Bldg., Balboa Park, San Diego, Calif. May 20, 1940. Paul D. De Lay, secretary, State Poultry Pathological Laboratory, Balboa Park, San Diego, Calif.

Keystone Veterinary Medical Association. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa. May 22, 1940. A. Henry Craig, Jr., University of Pennsylvania, Philadelphia, Pa.

Massachusetts Veterinary Association. Hotel Westminster, Copley Square, Boston, Mass. May 22, 1940. H. W. Jakeman, secretary, 44 Bromfield St., Boston, Mass.

Mississippi Valley Veterinary Medical Association, Inc. Abingdon, Ill. June 6, 1940. L. A. Gray, secretary, Bushnell, Ill.

Ohio State University Veterinary Conference. Ohio State University, Columbus, Ohio. June 12-14, 1940. O. V. Brumley, dean, Ohio State University.

Oklahoma Veterinary Medical Association. Oklahoma A & M College, Stillwater, Okla. June 17-18, 1940. F. Y. S. Moore, secretary, McAlester, Okla.

American Association for the Advancement of Science. Seattle, Wash. June 17-22, 1940. F. R. Moulton, secretary, Smithsonian Institution Bldg., Washington, D. C. (A.V.M.A. representative: Ward Giltner, Box 955, East Lansing, Mich.)

Eastern Iowa Veterinary Association, Inc. Tenth Annual Practitioners' Clinic. Dairy Cattle Congress Grounds, Waterloo, Iowa. June 18, 1940. H. E. Tyner, secretary, New London, Iowa.

Idaho Veterinary Medical Association. Buhl, Idaho. June 24-25, 1940. E. M. Gildow, secretary, Carnation Milk Farms, Carnation, Wash.

California State Veterinary Medical Association. City Auditorium, San Jose, Calif. June 24-26, 1940. Chas. J. Parshall, secretary, 319 B St., Petaluma, Calif.

South Carolina Association of Veterinarians. Greenville, S. Car. June 25-26, 1940. R. A. Mays, secretary, 415 State Office Bldg., Columbia, S. Car.

North Carolina State Veterinary Medical Association. Rocky Mount, N. Car. June 27-28, 1940. J. H. Brown, secretary, Tarboro, N. Car.

Montana Veterinary Medical Association. Bozeman, Mont. June 28-29, 1940. E. A. Tunnicliff, secretary, Montana Agricultural Experiment Station, Bozeman, Mont.

American Veterinary Medical Association. Mayflower Hotel, Washington, D. C. August 26-30, 1940. L. A. Merillat, secretary, 221 N. La Salle St., Chicago, Ill.

State Board Examinations

Iowa Veterinary Medical Examining Board. June 11-12, 1940. All applicants must be in the office of the Division of Animal Industry not later than 8:00 a.m., June 11. Further information may be obtained from H. A. Seidell, chief, Division of Animal Industry, State Capitol, Des Moines, Iowa.

Nebraska Board of Veterinary Examiners. June 17-18, 1940. All applications must be filed at least 15 days prior to the first day of examination. Further information may be obtained from Mrs. Clark Perkins, director, Bureau of Examining Boards, State Capitol Bldg., Lincoln, Neb.

PERSONAL NOTES

Births

To Dr. (Iowa '29) and Mrs. R. B. Mericle of Omaha, Neb., a son, Dale Thomas, February 4, 1940.

To Dr. (O.S.U. '35) and Mrs. George Berger of Rutherfordton, N. Car., a daughter, Mary Catherine, February 27, 1940.

To Dr. (Wash. '39) and Mrs. L. C. Murphy of Milwaukee, Wis., a daughter, Peggy Ann, November 6, 1939.

To Dr. (Iowa '34) and Mrs. Eugene B. Ingmand of Evanston, Ill., a daughter, Ann, April 16, 1940.

Activities

C. E. Sawyer (K.S.C. '21) of Puyallup, Wash., has been confined to his bed with swollen ankles.

Rudolph Snyder (Chi. '03) of University Park, Md., has been elected master of the Beltsville, Md., Grange.

John G. Hardenbergh (U.P. '16) of Plainsboro, N. J., is the author of "The Dairy World of Tomorrow" in *Certified Milk* for March 1940.

W. H. Stroup (Mich. '38) has resigned from the service of the federal bureau of animal industry at Lansing, Mich., and entered private practice at Elkhart, Ind.

P. C. Garner (Iowa '37), formerly employed by the Wisconsin state department of markets on Bang's disease and tuberculosis work, has located for practice at Baldwin, Wis.

O. H. Eliason (Ont. '01) of Madison, Wis., who has been connected with the Wisconsin state department of agriculture since 1912, has been appointed state humane agent.

C. H. Hofstrand (U.P. '13) of Leeds, N. Dak., president of the North Dakota Veterinary Medical Association, has been reelected president of the North Dakota Livestock Association.

W. G. Brock (Ohio '11) of Dallas, Texas, is the author of an article, entitled "What Veterinary Medicine Means to Texas," which appeared in the March 1940 issue of *The Cattleman*.

O. W. Schalm (Mich. '32) of the University of California at Berkeley, Calif., discusses "Control of Streptococcic Mastitis in a Certified Herd" in the March 1940 issue of *Certified Milk*.

Prepare to Visit the National Capital in August

Sam W. Wiest (St. Jos. '19) has resigned from the service of the federal bureau of animal industry and entered private practice at Santa Fe, N. Mex., where he has resided for many years.

Charles M. Carpenter (Corn. '17) of the Strong Memorial Hospital at Rochester, N. Y., has gone to Puerto Rico to do special research work in venereal diseases for the Puerto Rico department of health.

Morris D. Schneider (A.P.I. '36) has been granted a leave of absence from the federal bureau of animal industry to pursue post-graduate studies at the University of Wisconsin, Madison, Wis.

E. P. Johnson (Mich. '25) of the Virginia Agricultural Experiment Station at Blacksburg, Va., is the author of a new bulletin, entitled "A Method of Raising Turkeys in Confinement to Prevent Parasitic Diseases."

J. E. Shillinger (Geo. Wash. '14) of Washington, D. C., was chairman of the program committee of The Fifth North American Wildlife Conference, held at the Mayflower Hotel in Washington, D. C., March 18-20, 1940.

R. R. Isham (Wash. '21) of Auburn, Wash., is suffering from an infection in the region of the lower coccus vertebrae. One diagnosis was that this is an erysipeloid infection possibly contracted from hogs during meat inspection.

C. A. Bottorff (Wash. '28), who was associated with the University of New Hampshire at Durham, N. H., as poultry pathologist since 1928, resigned effective March 31, 1940, to accept a position with Lederle Laboratories, Inc., Pearl River, N. Y.

Ross H. Hurt (Wash. '38) has resigned his position as assistant veterinarian in the experiment station and instructor in the College of Veterinary Medicine, State College of Washington, to accept an assistantship in the animal pathology and hygiene division of the University of Illinois, Urbana, Ill.

M. A. Northrup (Wash. '35) of San Francisco, Calif., was a 158-lb. entrant in the National Amateur Athletic Union wrestling tournament held at Iowa State College, Ames, Iowa, April 5-6, 1940. Dr. Northrup entered a field of 14 contestants in his weight class and emerged a third-place medalist. He represented the Olympic Club of San Francisco. Ninety-one wrestlers from 15 states competed in the meet.

E. L. Maurer (Wash. '38) has resigned from the service of the federal bureau of animal industry to enter private practice at Bozeman, Mont. He also will act as a resident deputy state veterinary surgeon. (In Montana such

an appointment does not carry a definite salary but authorizes the appointee to make interstate inspections of live stock. Resident deputies also are paid a *per diem* whenever they do official work.)

DEATHS

C. A. Hauschen of Brewster, Minn., died on November 2, 1939.

Born at Emmetsburg, Iowa, February 10, 1904, Dr. Hauschen was graduated from Iowa State College in 1926. He joined the Association in 1931.

Sigel H. Gallier of Norman, Okla., died of spinal meningitis in September of 1939.

Born on October 18, 1874, at Harrisburg, Ill., Dr. Gallier was graduated from the Kansas City Veterinary College in 1909. He joined the Association in 1935.

Clement A. Hamblet, 70, of Lowell, Mass., died at his home on March 17, 1940.

Dr. Hamblet was born in North Chelmsford, Mass., May 26, 1869, and was graduated from Harvard University in 1897. For 28 years preceding his death he served as inspector of meats and vegetables in Lowell, in addition to conducting a successful practice.

Arthur G. Hall of New York, N. Y., died on April 19 in a train wreck in Little Falls, N. Y., while enroute to Rochester, N. Y., to attend an executive board meeting of the New York State Veterinary Medical Society.

Dr. Hall, a graduate of Cornell University, class of '08, was employed at the time of his death as field veterinarian with The Borden's Farm Products Co., Inc.

F. E. Henderson of Elko, Nev., died on March 15, 1940, at the age of 41.

Born in Altus, Okla., July 1, 1898, Dr. Henderson was graduated from Kansas State College in 1929. Immediately after his graduation, he accepted a position as veterinary inspector in the Nevada state department of agriculture and was employed in that capacity at the time of his death.

Dr. Henderson joined the Association in 1929.

Thomas D. James of Scranton, Pa., died on October 31, 1939, following several months of illness.

Dr. James was graduated from the University of Pennsylvania in 1908. During the World War he served as a major with the Twelfth Field Artillery. At the time of his death he was veterinarian for the Hudson Coal Company, a position which he had held for 15 years.

Dr. James joined the A.V.M.A. in 1912.

Equine Encephalomyelitis

The price of encephalomyelitis vaccine has recently been reduced 60 per cent.

The report of the Chief of the U. S. Bureau of Animal Industry dated January 20, 1940, shows that while the incidence of this disease was much less in 1939 than in the previous year, it was still sufficiently prevalent to constitute a real menace to the horse population if vaccination is neglected.

IT IS PROPER FOR VETERINARIANS TO BRING TO THE ATTENTION OF HORSE-OWNERS THAT THE DISEASE HAS NOW OCCURRED IN ALL OF THE STATES WEST OF THE MISSISSIPPI RIVER, AND THAT CASES HAVE BEEN REPORTED IN ONE-THIRD OF ALL THE COUNTIES OF THE UNITED STATES. THE REPORT ABOVE REFERRED TO SHOWS THAT MORE THAN 8,000 CASES WERE REPORTED TO THE BUREAU IN 1939.

Information now available indicates that the duration of immunity following the use of chick embryo type vaccine is usually eight months or more, but that after ten months many vaccinated animals are not immune. This emphasizes the desirability of annual vaccination in the spring.

We shall be glad to furnish, free of charge, cards suitable for distribution to horse-owners. We also have a series of three short articles intended for insertion in local newspapers which will be furnished upon request. Both the cards and articles emphasize the desirability of early immunization and should help practitioners to get the bulk of this work out of the way before the rush incident to the immunization of spring pigs.

IT IS PARTICULARLY IMPORTANT THAT EACH YEAR'S COLT CROP BE PROTECTED BY IMMUNIZATION.

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EQUINE ENCEPHALOMYELITIS VACCINE (chick embryo origin)

The new, modern, fully equipped laboratory building devoted exclusively to the production of Equine Encephalomyelitis Vaccine is illustrated below. This up-to-date double unit structure located on the Jen-Sal Biological Farm, includes incubators—refrigerators—virus inoculating, harvesting, preparation, and sterilizing rooms for the production of both Eastern and Western vaccine. Test rooms and offices are located on the lower level.



High protective immunity against Equine Encephalomyelitis by vaccination with chick embryo vaccine has been demonstrated by classical laboratory experiments and by field experience.



"... probably no less than 3,000,000 horses and mules (about one-fifth of the entire number) received specific prophylactic treatment (1939). Just how greatly this extensive application of vaccine retarded the spread of the disease is problematical, but it probably was one of the major factors."—J. R. Mohler, Chief of the Bureau of Animal Industry, Washington, D. C.

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KANSAS CITY, MO.

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